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Practical Application of the Principles of Health Department Program Planning to Local Tuberculosis Control*

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ONE of the greatest contributions which the trained health officer can render his community is in the field of public health program planning. The difference between a successful series of activities meeting community health needs and those which merely grind out inefficient services along traditional paths depends largely on careful program planning. We might delve into some of the more important concepts in this realm before describing their actual application to the problem of tuberculosis control in one specific county.

PROGRAM PLANNING

There are three axioms ‡ which seem essential in program planning:

A. What does the community *require* in the way of public health activities? This may be stated as the health "needs" which exist in the community.

B. What does the community *desire* in the way of public health activity? This may be stated as a community's wishes or attitudes toward specific health activities.

C. What *facilities* are or can be made available to the community to satisfy these requirements and attitudes? This includes all varieties of skills, scientific knowledge, personnel and materiel required for the performance of valid health programs.

If we consider the application of these axioms, we become aware of numerous guiding principles, eight of which will now be mentioned.

1. All three axioms must be considered equally in program planning. Too great a preponderance of one will usually result in a poor program with inefficient results. Compromise between the axioms thus becomes essential to success.

An example of an over-emphasis on community needs is the attempt made

* Based on a paper presented before the Pennsylvania Tuberculosis Society at the Annual Meeting in Pittsburgh, Pa., May 26, 1949.

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‡ The term "axiom" is used in the sense specified by Margenau [1]: "any basic (unproved) hypothesis which has deductive fertility."

through legislation for the compulsory hospitalization of the tuberculosis case. Although health workers must admit that this compulsion should satisfy a real health need, we appreciate that such action is so contrary to the community's wishes that the net result proves a disadvantage to the total control program.[2]

Facilities may at times be used beyond the needs and wishes of a community. In some areas where voluntary agencies must develop programs in the absence of a strong local health unit, there may be a tendency to make greater use of the mass survey technique than can be justified by the extent of the available field and hospital case control facilities. Tuberculosis case finding is important—but it is more important that case control services keep pace with any major expansion in case finding activities.

2. Programs should never become fixed. Health problems (needs) are in a constant state of flux; hence the programs devised to solve them must also be subject to change. Similarly, changes in the community's facilities and attitudes as regards health must also lead to adjustments in health programs.

One classic example of such change is the story of air disinfection. From the days of Lister when carbolic acid was sprayed indiscriminately, to the aseptic techniques of Halstead, we have finally returned to a greater appreciation of the need for and nature of air disinfection. Today we find that interesting studies are under way, aimed at exploring this use of ultra-violet rays and propylene glycol mists.[3]

It is perhaps allowable to surmise that if a specific treatment were available for the tuberculous of an efficiency approaching that of penicillin in syphilis, compulsory hospitalization for the infectious case of tuberculosis would be permitted by the community.

3. Public health education must be purposefully utilized to influence community "wishes" and thereby bridge the gap between local health needs and local use of facilities.

The patient who may develop the early symptoms of cancer must be taught the existence and use of available facilities and motivated to seek consultation from private physician or detection clinic. The acceptance of pasteurized milk has had a long uphill fight, but public health education has proved its worth in achieving 100 per cent pasteurized milk usage by many of our urban populations.

4. Public health education should be used as an effective tool only when a need exists, and when the required facilities are, or can be, made available to meet the need.

One of the most striking examples of this principle is afforded by arthritis, a condition which affects some 7,000,000 Americans. Despite the unquestioned need for a solution to this problem, science has yet to provide adequately the facilities to meet this need. Until that time arrives, health education should be utilized in relation to other health problems where efforts will be productive of results.

5. Great care should be used to determine accurately and objectively the health needs of the community.

Those employed in local health work must not be too susceptible to pressure from above (the state and federal health agencies), or from below, i. e., the population itself. In general, the local health officer, being aware of the needs in his community, should select from among such programs initiated at all levels only those aspects which are required to meet his local problems.

Many sources must be utilized in an analysis of the community's health needs. Besides routine reports, special studies or surveys may be indicated. One such dental survey has been done recently in our county seat which is

serving as a control in a two-city dental caries water supply fluorination study.[4] It has been shown [5] that in an economically superior area of the city, 80 per cent of the children have not received adequate dental care, a fact which seems to indicate that there is a lack of education with respect to this need. Hence, such a survey not only pointed out the need for a specific health program, but indicated that the major emphasis should be on education.

6. We must search continually for new health facilities.

This includes the field of research. Not only must advantage be taken of recent additions to medical science, but often the locality itself may make its own contribution to health knowledge. The recent smallpox outbreak in New York State afforded a city health commissioner the opportunity for adding greatly to our understanding of the smallpox immunity status of an urban population as demonstrated by the response to vaccination.[6]

When facilities are available in an absolute sense but not in practical terms to a given community, the health officer should take all reasonable steps to secure them for his citizens. It may be possible to utilize central state facilities when the local need is acute but too limited to justify local elaborate corrective measures, as is often the case with respect to cerebral palsy.

7. The health program must be balanced, but priorities should receive the major share of attention.

Perhaps the most difficult problem in program planning is that which deals with the correct appreciation of high priority services. The determination of priority must be based primarily on needs, but a complete victory need not be won over a high priority service before beginning programs of lesser importance to the health of the community.

Some health workers have found it difficult to answer the question as to whether a dental care program should be undertaken while deaths from tuberculosis are still occurring. This leads to the concept of program balancing: that we need not solve completely the problem presented by a high priority service in order to take on work of lower priority. As long as we have developed high priority services efficiently and successfully, it is more valuable to undertake some program of lesser importance than to utilize our total effort toward perfection in top priority fields.

When we reach the point where additional gains in a high priority program can only be achieved at the expense of intensive, relatively inefficient effort, then it must be admitted that if this additional increment of effort were spread over many lower priority services, the result would be of greater value to the total health program.

In addition, with the needs constantly changing, one cannot always determine the identity of the high priority programs of the future. An effective start in a low priority service now, may well permit its rapid expansion later, should our appreciation of its significance be revised upward. Moreover, our beginning efforts may well uncover facts which in themselves may indicate the need for future effort. A recent diphtheria blood-antitoxin-titer survey of high school students demonstrated that one-quarter of this age group must be considered as susceptible and leads us to wonder if our immunization programs for this disease ought to be continued throughout the school age period.[7]

Notwithstanding the above apology for a balanced program, low priority services must never be allowed to *replace* more important work. The local health officer who spends 50 per cent of his time in annual school health examinations, the local health department which allots a major share of its budget to food sanitation while failing to provide sufficient public health

nurses, well baby conferences, and tuberculosis field clinics, is guilty of one of the gravest errors in public health planning.

Priorities, of course, exist not only between programs, but also within them. It has recently been demonstrated that despite the high priority of tuberculosis control, the reëxamination of tuberculosis contacts is relatively unproductive, once a first examination has proved negative.[8]

8. The entire program must be continually evaluated in the light of long-range goals and practical objectives.

A long-range "goal" is understood as the ideal: the best performance that is believed possible of attainment on the basis of our present scientific knowledge. On the other hand, public health workers must be practical, and our "objectives" should be levels which are attainable in a reasonable period of time. The objectives, therefore, must depend on the axioms and principles, with particular emphasis on priorities and program balance. At the end of the specified period an evaluation will permit a readjustment of the program—a resetting of objectives based on current measurements of community needs, wishes, facilities, and recent health department performance. We may find that our objective in tuberculosis control has not been attained, while we have exceeded our plans for diphtheria control. Granted that both programs still hold their original priority status, the wise health officer will then deemphasize his diphtheria program in favor of efforts to improve tuberculosis programs. Yet he will continue to keep his diphtheria services channelled toward the long-range goal of *perfect* control.

Objectives and evaluations, therefore, should be rendered primarily in terms of long-range goals. These ideals, lying always beyond our reach, yet act to provide the true direction and measure of progress (though not the time table) for our practical efforts.

Conclusions from evaluations are especially meaningful if drawn in the light of past performance. This longitudinal survey in a single health jurisdiction over a period of time is often far more valuable than the cross-sectional comparison which sets up against each other different areas unlike with respect to health needs, facilities, or community attitudes.

APPLICATION OF THE PRINCIPLES OF PROGRAM PLANNING TO TUBERCULOSIS CONTROL IN ULSTER COUNTY

A. *Review of Axioms*

As the year 1946 drew to a close, our county tuberculosis sanatorium had 32 of its 56 beds occupied by resident active cases. There were no field clinics in the county. The daytime clinics at the sanatorium were under the direction of a voluntary agency, resulting in a good deal of confusion between field and clinic services. During the previous two decades, almost a score of employees at the local general hospitals contracted tuberculosis. Statistically, the tuberculosis roster showed only 50 per cent of contacts had been x-rayed, 60 per cent of known cases had no sputum reported, and 50 per cent, no x-ray during the previous 12 month period. Tuberculosis death rates and morbidity had fallen, but less than might have been expected.

While a serious tuberculosis problem existed, community interest and wish for tuberculosis control was unusually high. Many patients and contacts travelled long distances to secure recommended x-rays. A pioneer voluntary association community x-ray survey in 1946 secured a 50 per cent response from adult residents of a geographically large rural township, despite the fact that the equipment was established in only one location. The appropriating

body of the county had constructed a modern tuberculosis hospital 15 years before and had never failed to provide amply for its operation.

It was apparent that new facilities were required as well as better use of those which were available. A well staffed laboratory was giving efficient service but had not yet instituted the routine culturing of concentrate-negative sputum. The sanatorium had no available portable x-ray equipment, and the overworked part-time sanatorium director was unable to find time or personnel to staff a field clinic program. Health workers responsible for follow-up activities were under the general supervision of a district state health office, but owed allegience to 25 different local part-time health jurisdictions.

B. *Review of Principles*

It was immediately evident that all three axioms had not received equal consideration. While needs were recognized and the community attitude was excellent, the control facilities were not being utilized to the fullest extent, and additional facilities were required. It should be noted, in addition, that the county tuberculosis program had not kept pace with current trends in New York State. Although health education was used and used well, it had to work under a tremendous handicap. The local tuberculosis association and health nurses could hardly be expected to persuade many citizens in peripheral areas to undertake a 60 to 80 mile round trip for a chest x-ray.

With the advent of the county health unit in January, 1947, it was realized that a careful appraisal of the existing problem was required, and the tuberculosis association willingly undertook to provide personnel to determine the exact extent of the local tuberculosis needs. Soon after its formation, the county board of health secured a full-time director with unusually excellent training in both the public health and clinical aspects of tuberculosis.

The public health nursing director assumed the task of supervising the hospital outpatient x-ray services so that the field and clinic program could be integrated. By April, the portable x-ray equipment had been secured, a routine field clinic service instituted, and in another few months the 56 beds at the hospital were wholly occupied by active infectious cases. The laboratory established the routine use of the sputum culture which added to the accuracy of the case finding program.

The local tuberculosis association, realizing that there would be a delay before the official agency could accept the responsibility of providing routine x-rays on admissions to general hospitals, financed the first six months of this program. Mass chest x-ray surveys were undertaken in 1948 as a coöperative project, with emphasis first on those peripheral localities where case finding activities were especially needed. Health education techniques of many varieties were then used to make possible the full utilization of a new facility (mobile mass x-ray unit) to meet an acute need for adequate case finding in tuberculosis.

It was quite evident that tuberculosis control had to be afforded a high priority. At the same time, other important programs were expanded as well, necessitating a redistribution of effort on the part of the staff. Unproductive child health conferences were closed, while others were opened or expanded. A health educator was provided to streamline and direct a pressing public relations and education load. Additional clerical assistance was provided to free professional time. The venereal disease, medical rehabilitation, and morbidity programs were carefully scrutinized so that unproductive low priority work could be deëmphasized.

Other important services were receiving attention in an attempt to keep the

total program in balance. Efforts in milk control were rewarded as the county soon developed one of the best supplies in the entire state. Reported immunizations doubled, and a gradual increase in the cancer program was instituted, which should culminate soon in an all-out attack upon the problem when the tumor clinic is in operation.

Evaluations of the results were made periodically. The proportion of contacts to new cases examined rose from 50 to 75 per cent within the first 18 months, the sputum-unknown group dropped from 60 to 30 per cent, and the per cent of cases with unknown clinical status, from 50 to 17 per cent. The increase in clinic, mass survey, and general hospital films resulted in the discovery of more than twice as many new cases of tuberculosis. By mid-1948, the additional clinic x-rays and sputum examinations resulted in the removal from our active files of numerous noninfectious cases, permitting the staff to direct their efforts toward cases presenting a true hazard to the community.

That this was not wholly a success story must be mentioned. Even the brief statistical data quoted above indicate that much remains to be done in the light of long-range goals. Program balancing in a new health department is frequently difficult, and some programs temporarily lack the full attention they deserve. Yet each year sees improvement. Readjustments must frequently be made, personnel and situations change, but the basic principles of program planning have so far been flexible enough to keep pace with these changes.

CONCLUSIONS

What has been described for tuberculosis control might have been reviewed in relation to many other health department programs showing varying degrees of success. The rapid progress in tuberculosis control in this county appears to be due to the fortunate provision of an effective administrative pattern for local health work, coupled with an unusual attitude for progress in this field on the part of our agencies and citizens. Yet, no matter what the degree of immediate success, no matter what the tribulations in its achievement —a full-time local health department is the administrative pattern which has the best opportunity to render efficient service. It owes much of this effectiveness to a unique capacity for carrying through the essential principles of program planning. Writes Haven Emerson in his *Local Health Units for the Nation:* "What is essential is that no population unit or area of the United States remain any longer without a full-time medically directed health service responsive to the needs and wishes of the people of the area."[9] With that statement, there has never been any significant disagreement.

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How Good Is the Industrial Hygiene Program?

A Challenge to the Local Health Department

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"Industrial hygiene is one of the most important topics in preventive medicine and hygiene, as it deals with the health, the welfare and the human rights of the vast majority of the adult population. . . . The object of industrial hygiene is to protect the health of the worker, whether in mines, ditches, factories, stores, ships, farms, banks or houses. The object of industrial hygiene is also to prevent industrial diseases, but the control of special health hazards does not solve the problems of the health of the worker. Industrial hygiene is nearly as broad as adult hygiene itself—indeed, industrial hygiene runs the whole gamut of hygiene and sanitation. It deals with the problems of industrial poisons and dust; ventilation, temperature and humidity; light, noise and nuisances; cleanliness, plant sanitation, overcrowding; hours of labor, rest periods and fatigue; child labor; women in industry; workmen's compensation; medical and nursing service, physical examinations, communicable diseases in the factory, mental health, personal hygiene."—*Rosenau* [1]

SINCE we believe that "the local health department has the general responsibility of providing effective leadership in meeting all types of community health needs," [2] it is appropriate to review critically our public health programs in the light of Dr. Rosenau's forthright statement. If his comment was correct in 1935, it is even more cogent in 1950 as we enter the atomic age in this highly industrialized America.

ADEQUACY OF GOVERNMENTAL INDUSTRIAL HEALTH SERVICES

There are in the United States only 13 local and 44 state industrial hygiene units, two of which are a part of the state labor department (Tables 1–3). More than half of these units have five or less personnel, with 17 (30 per cent) having only one or two persons. Only 25 (44 per cent) have any medical personnel and only 30 (52 per cent) have nursing personnel. The personnel available is in most cases insufficient to do substantially more than specific studies upon request. Little time or man power is available for going into the hundreds of thousands of plants, large and small, in which hazardous conditions prevail.*

Moreover, the great bulk of the inadequate number of industrial hygiene workers is comprised of those in the "environmental" phase of the work: engineers, chemists, and technicians. Medical investigation is essential in appraising the effects of the exposures measured by the engineer and chemist. The limitations of mechanical application of "Maximum Allowable Concentrations" are well known to the industrial hygienist.

* The state labor department industrial safety programs are similarly inadequate. There are about 800 inspectors in all the states to safeguard upward of 40,000,000 workers subject to the jurisdiction of state labor laws. The majority of these give only part time to safety and health work for they must also inspect for compliance with wage and hour, child labor, and other laws. In 1946 in Michigan, there was a total of 20 factory inspectors. In Alabama there were 11, 8 of whom worked only in the coal mines. Even in states like New York and California, the safety staff was physically incapable of inspecting each plant subject to the law even once a year.[14]

Official Industrial Hygiene Units in United States *

1. Summary *

Type Unit	*No. Units*	*Physicians*	*Engineers*	*Chemists*	*Nurses*	*Other*	*Total*
State	44	34	137	54	32	89	346
Local	13	3	17	4	10	36	70
Totals	57	37	154	58	42	125	416

2. By Size of Staff *

No. Personnel	*No. Units*
1–2	17
3–5	15
6–10	15
11 over	10

3. By Type of Personnel *

Type of Personnel	*No. Units*
Physicians	25
Nurses	30
"Environmental" group †	57

* Source: *Directory of State, Local & Territorial Hygiene Personnel*, USPHS, March, 1950. This directory does not include positions which were vacant. On the other hand, it does include some part-time workers who have been counted in this table as being full-time.

† This group includes engineers, chemists, and other technicians such as "industrial hygienists." The designation, "industrial hygienist," is confusing as it may refer to a highly trained engineer or chemist in one state and to a sanitarian or relatively untrained technician in another.

Further, if one approaches the field with the viewpoint of "adult health" it can be seen how far short of the mark most of the existing programs fall. The well defined occupational diseases comprise a relatively small part of the occupational health picture. Cancer, heart disease, tuberculosis, and other clinical conditions frequently related to occupation receive pitifully little attention from industrial hygiene agencies. And the more subtle problems such as fatigue and mental impact of occupations go begging for study.

To make matters worse, most states have no accurate knowledge of the size of their problems, due to the inadequacy, or in many cases the total absence, of occupational disease reporting. Since it is generally accepted that there occurs one occupational disease to every 10 or 15 occupational accidents, one gains an impression of the magnitude of the problem by examining statistics on disablement, death, and absenteeism from occupational causes. In 1947–1948, the nation's industries reported an annual incidence of two million lost-time injuries (lost time = absence of 1 day or more), 17,000 deaths, 90,000 permanent disabilities, 41,000,000 man-days lost and financial loss to employers of over three billion dollars.[3] These figures are an underestimation because they are based on reports submitted for workmen's compensation, which in no case is complete in coverage.

LABOR'S GROWING INTEREST

It is not surprising, therefore, that labor groups, dissatisfied with existing services, have demanded that industrial hygiene programs become a part of federal and state labor departments. Several bills have been introduced into the Congress in recent years to accomplish this, and the major labor federations support the proposals.[4]

The public health movement is faced with an important challenge here, for obviously it cannot ignore the interest of at least the organized part of some 65 million or more workers who, with their dependents, comprise the great majority of the nation's population. In recent years, trade unions have demon-

strated increasing activity in health matters. Through collective bargaining agreements alone, by mid-1948, more than 3 million * workers were covered by some type of health, welfare, or retirement benefit plan[5]; and millions are protected by health, safety, and sanitation provisions written into their collective bargaining contracts.

The following factors are germane to the subject but they lie outside the scope of this paper: status of the workmen's compensation laws which are fundamental to the progress of industrial hygiene; the inadequate legal basis of the industrial hygiene program in many of the states; the relationship of the federal and state public health and labor departments; the attitudes of industrial health agencies to management and labor.

OPPORTUNITIES FOR THE HEALTH DEPARTMENT

It is clear that if public health agencies are to give the function of industrial health service more than lip service, vigorous efforts must be made to extend public health into the places where people work. This paper does not attempt to offer a complete solution to a problem so fraught with complex social and economic factors, but it does suggest some ways in which the health department, especially the local health department, might effectively bring better public health to the industrial community.

Industrial hygiene for long has been a narrow "fringe" service surrounded by an aura of highly technical specialization. Probably for this reason, it has continued to operate, with few exceptions, as a state-level function, rather than as a basic local health service.

The California Department of Public Health believes that industrial health, like the other elements of public health, should be administered on the local level so far as practicable. Its Bureau of Adult Health promulgates the concept that a substantial part of industrial health service can be handled by extension of existing health services into the factory and field. The factory should receive a proportionate share of attention as, for example, the school now does. A relatively small sector of industrial health requires the attention of the skilled hygienist and his specialized equipment and facilities.

The health officer is encouraged to inventory his program to see whether opportunities to reach the employed population are being exploited:

GENERAL COMMUNITY HEALTH

Morbidity—The average worker loses 15 times as much time from non-industrial injuries and illnesses as he does from occupational causes.[6] Is the local health department cognizant of the sickness absenteeism problem in the industries in its area? Does the department offer assistance to these industries in reducing the incidence of illness through case finding studies, nutrition consultation, health education, sanitation, communicable disease control, and other services? In several states, the disability insurance program now offers a valuable source of information on non-occupational illness hitherto unavailable.

Case Finding Studies — Are case finding studies *planned* for industrial groups, or are they occasionally conducted among them because they offer convenient aggregations of people? Certain occupational groups, such as those in the dusty trades, should be systematically investigated not only for the pneumoconioses but also for tuberculosis because these workers are notoriously subject to tuberculosis. Further, the health department can materially assist employers to improve their health services by offering miniature x-ray services on a regular periodic basis. The multiphasic study technique ap-

* Present estimate is 5 million or more.

plied to occupational groups now offers great possibilities, not merely in case finding but in elucidating basic socio-medical factors in health and disease.

Rural Health — Mechanization and modern chemicals have brought factory conditions to the farm but under far less satisfactory circumstances for coping with them. The occupational death rate for farmers exceeds that of factory workers.[7] Farmers lose 9 per cent of their gross income from accidents.[8] In California in 1949, 14,202 farm-hands had disabling accidents, and almost 60 were killed.[9] There were 300 officially reported cases of occupational poisoning from agricultural chemicals.[10]

Health on the farm in general is not what many used to think it was. A recent study showed the prevalence of disabling illness among agricultural workers to be greater than among non-agricultural workers.[11]

The interested health officer can find much to do in this field. For example, in the past year, a new series of insecticides, known as organic phosphates, caused numerous poisonings and several deaths. Private practitioners were suddenly presented with a clinical entity about which they knew nothing. The health officer was in a strategic position to supply data on diagnosis and treatment which were available but not yet generally known.

SANITATION

Basic Environmental Sanitation—Do the sanitarians inspect local industries for basic sanitary facilities? To the knowledge of this writer, public health sanitarians virtually ignore industrial plants except where cafeterias require inspection. Only recently the author saw an industrial plant of 200 employees where there were neither drinking water nor toilet facilities. Availability and use of washing facilities is the most important factor in reducing the incidence of dermatitis, which constitutes the largest single category of occupational diseases.

The sanitarian and sanitary engineer can also be effective in the more technical phases of industrial hygiene by (a) informing the state industrial hygiene agency of problems to be investigated; (b) assisting the state agency in the actual study and solution of the problems; (c) learning to do some of the simpler procedures such as carbon monoxide testing. The state agency should be requested to organize courses of training for local personnel or to furnish training funds.

Air Pollution — The Donora tragedy found health departments ill prepared to assume responsibility for keeping community air clean. Aroused public opinion, nevertheless, is insisting on action. The health department with an industrial hygiene program has a nucleus around which to build an intelligent and authoritative approach to its own community air pollution problems.

COMMUNICABLE DISEASES

There are many problems of special importance to occupational groups: for example, brucellosis, Q fever, anthrax, epidemic kerato-conjunctivitis, tuberculosis, and upper respiratory infections. Upper respiratory infections comprise the largest single cause of sickness absenteeism. The health department can bring to industry its expert assistance in the control of these diseases.

CHRONIC DISEASES AND REHABILITATION

Has the health officer become informed about the problem of the older worker and the physically handicapped worker in his community? Can he assist in improving their employment possibilities by informing management of the facts of employability of these people? Is there coöperative effort between the health department and the vocational rehabilitation program? In some areas the health officer acts as

medical consultant to the vocational rehabilitation program. Here is an opportunity to build both the rehabilitation and the public health services by mutual effort.

MENTAL HEALTH

There is much talk of accident proneness. Has the health officer examined the incidence of industrial accidents in his area? Does he participate in community activities concerned with recreation, housing, and other factors important in mental health?

MATERNAL AND CHILD HEALTH

About 30 per cent of the labor force in the United States is female. Women workers have special problems of pregnancy, dysmenorrhea, and the problems arising from the stress of work added to domestic responsibilities. The maternal and child health program might with profit look into those industries in which there are large numbers of women workers. In one city, the health department holds well child conferences in the premises of a union hall. In some areas, particularly farming regions, the health officer might well examine the health aspects of child labor.[12]

PUBLIC HEALTH NURSING

Is there liaison between the public health nurses and the local industrial nurses for the exchange of information and promotion of the public health program in industry? The industrial nurse is functionally in large measure a public health nurse. Through her close contact with the workers, she can be a valuable ally to the health department in reaching the industrial population. Since workers spend one-third of their lives in the factory, the industrial nurse's position is not unlike that of the school nurse.

Conversely, the public health nurse can help the plant nurse as a family and community contact in the many industrial problems, such as absenteeism, illness, and emotional situations in which home or community factors play a part.

HEALTH EDUCATION

Does the health educator reach the organizations of the working man and woman in the same proportions as he does other groups? Does he furnish materials to the union newspapers; motion pictures and talks for union meetings and for union women's auxiliaries? Recently the U. S. Public Health Service and the Pennsylvania State Health Department organized a course in industrial hygiene and safety principles for shop stewards of the United Steel Workers in Pennsylvania. Why cannot this approach be employed for other public health matters? Similarly the health educator should work with chambers of commerce and other management groups.

INDUSTRIAL MEDICAL SERVICES

One of the urgent unmet needs in industry is the almost complete absence of medical service for workers in small plants. The familiar cigar-box first aid kit symbolizes medical service to the two-thirds of American workers who are employed in plants having less than 500 workers. Economic factors make it impractical for most small plants individually to provide preplacement and periodic physical examinations and the other necessary in-plant medical and nursing services.

Moreover, too many large industrial organizations still offer poor services or none at all. Yet when industries are shown that prevention of occupational disability pays financially, they will consider seriously offering good services.

The health department can stimulate groups of small plants to provide in-plant medical and nursing services by group financing of costs of medical and nursing personnel and physical facilities. Two county health departments in Georgia have successfully promoted such

services.[13] Similarly, the Connecticut Division of Industrial Hygiene has played a leading role in setting up small plant programs in Hartford.

It should not be forgotten also that example is a good teacher. Let the health officer examine the medical program, if any, which is available to the employees of the health department.

Many other activities of the public health department, such as nutrition and dental health, might be discussed in the same vein. Whether these activities are planned in connection with a formal industrial or "adult" health program, or whether they are integrated into the structure of the fundamental work of the department, does not matter. Important only is the fact that the working population is recognized and given service.

LARGE INDUSTRIAL CENTERS

In the larger, more industrialized areas (population over 100,000), specific industrial hygiene services should include the medical, engineering, chemistry, and nursing services necessary in the prevention of occupational disease and the promotion of good industrial health practice. The health officer must not delude himself into thinking that employment of an industrial hygiene engineer or sanitarian constitutes an industrial hygiene program. Rather, this is only a beginning. Where budget permits employment of only one or two such persons, some definite arrangement should be made with the medical and nursing sections of the department for specific and well defined participation in the work.

STIMULATION OF LOCAL HEALTH INTEREST

The California Department of Public Health implements its program of interesting local departments in industrial health work by means of many approaches, including the following:

1. The Bureau of Adult Health sends reports on all industrial hygiene studies made to the local department in whose jurisdiction the plant is located.

2. Wherever possible, personnel from the local department participate in the actual conduct of the study.

3. All local departments receive periodic reports of occupational disease incidence according to location, industry, diagnosis and other categories. Several local departments which have potentialities of building their own program, or already have a partial program, receive and utilize individual case reports of occupational diseases.

4. The Bureau carries on systematic education of local department personnel in industrial health practice. For example, the sanitation consultant holds orientation courses with local sanitarians, including actual work in the factory. Formal training institutes are conducted for local sanitarians and sanitary engineers by the Bureau in collaboration with the University of California. Similarly, the industrial nursing consultant has developed institutes and collaborated with the university in planning courses for industrial and public health nurses.

5. In one county, on invitation from the local health department, the Bureau organized a county-wide survey of the industrial health needs of the community as a demonstration project. The team of surveyors included personnel from the local department, the State Department of Labor, the State Health Department and the U. S. Public Health Service. It was an exemplary instance of coöperation of various governmental agencies. The study helped to create wide public interest in an industrial health service and it is hoped thereby to enable the local health department to develop its own complete service. At this writing, this department has already been authorized to employ an industrial hygiene engineer and some services have been started.

CONCLUSION

Occupational health programs offer an unusual opportunity to the local health officer. Occupational diseases are completely preventable, yet they now occur in large numbers. Moreover, occupational health is a keystone in the fundamental study of the social and environmental factors, so important in the mental and physical health of all people. The public health department needs to recognize and act on these facts, realizing that occupational health is a basic and necessary public health service.

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Health Resources Advisory Committee Appointed

Announcement was made early in September of the appointment of the Health Resources Advisory Committee to the National Security Resources Board, Washington, which is under the Chairmanship of Howard Rusk, M.D., of New York University College of Medicine. In addition to advising the National Security Resources Board it seems likely that this committee will have responsibilities of advising Selective Service on drafting of doctors.

Members of the Committee besides Dr. Rusk include William P. Shepard, M.D., San Francisco, a Vice-President of the Metropolitan Life Insurance Company and President-Elect of the American Public Health Association, for public health; John Pastore, M.D., Executive Director, Hospital Council of Greater New York, representing hospitals; Harold S. Diehl, M.D., Dean of the University of Minnesota School of Medicine, Minneapolis; James C. Sargent, M.D., Milwaukee, Chairman of the Council on National Emergency Medical Service, American Medical Association; Mrs. Ruth Kuehn, Dean of Nursing at the University of Pittsburgh, and David M. Heyman, Chairman of the Board of the Health Insurance Plan of Greater New York, member of the New York City Board of Health, representing the public; Leo J. Schoeny, D.D.S., New Orleans, representing the dental profession.

The Family Record in the Red Hook-Gowanus Health Center District

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TO an increasing degree the fulcrum of health department activity is in the area of personal health services — medical, nursing, and educational. These services are given with the object of promoting the health of the community and reducing the incidence of preventable disease. To achieve an objective which involves education of the individual toward a change in his habits and attitudes, coördination of service is a most important element.

At present, personal service activities in the New York City Department of Health have not achieved maximum integration on two planes — (1) a unitary approach to the individual by different functional bureaus of the department, and (2) a unitary approach to the family. The desirability of integration on the first plane is obvious. It has also become generally recognized that the family is the social unit which most significantly correlates the status of all its members in regard to nutrition, housing, mental health, chronic and acute disease, as well as economic level, cultural and educational pattern.

The family record is a basic tool in promoting integration of services on both of the above mentioned planes. The family record serves as such a tool by providing a single orderly arranged document giving a picture of the health and social status for the family as a whole as well as the particular problems of each of its members. The nurse and physician therefore have the information necessary to integrate properly the problems of the individual with those of the family. The record furthermore encourages consideration of each member of the family in addition to that of the presenting case, and thus promotes case finding.

In addition to the complete family roster and the index of services which the family has received, the family record also includes notations of services rendered, plans executed, instruction and advice given, extent of teaching done, family reaction, and action pending. Notes on the family's relation with social agencies, history of past problems, and periodic summaries of the health status of the family complete the picture.

The value of such information is just as great in the clinic as in the home. Armed with greater knowledge of the family, the physician or nurse can give more concrete and more effective advice in handling the problems presented. A family record brings together the health problems of each individual into a family composite, a pattern which corresponds to everyday experience. It becomes possible to give consideration to the family's nutrition, the mental attitude of one member of a family toward another, the relationship of housing to rheumatic fever, and similar problems. It permits continuity of care, a most important aspect of personal health

service. The family record is a sine qua non for such an approach.

The record also serves to streamline the functioning of Health Department services. Duplication of effort is diminished by avoiding unnecessary repetition of questions to the patient. This is an important factor in improving patient-staff relations. The patient is less likely to be "impressed" with the red tape connected with the service. A definite reduction in the percentage of not-at-home visits has accompanied the institution of the family record. Clinic appointments are more frequently kept. It is obvious that this results in more effectively planned activity, with less waste of physicians' and nurses' time.

Supervision is also provided with a potent tool by the family record. The records of the families living within a single nursing area are filed in one file drawer. This enables the supervisors to review the case load of a staff nurse periodically. The needs of a particular area can be ascertained and, if necessary, service allotted to this area can be altered.

A record which is present whenever a service is rendered and on which an appropriate note is made, lends itself to the purpose of tallying services for statistical computations. The fact that the same record has a complete family roster provides a household population base for these statistics. The numbering of these records according to district of residence whose census enumerations are available, provides a general population base. The technical procedures for using the records in this way have been worked out, although not as yet put into operation. The record and the filing system present a large reservoir of well organized material suitable for special studies of health, medical, and nursing problems.

From the point of view of the health officer, all of the considerations mentioned above which tend toward improved service and more efficient use of medical and nursing time are of utmost importance. When specific problem situations are being considered by the health officer, the completeness of the information about the family is of obvious importance in arriving at sound decisions. The family records bring to the fore the epidemiological significance of the family unit. Experience with the family record lays the groundwork for sound concepts of administrative relationships of the various health department activities, necessary to provide desired unity of services.

These factors have for a long time been recognized as indicating the need for a family record. The family record is now in use in many agencies, including county health units and visiting nurse associations. The departments of health of Columbus, Ohio, and Westchester County, New York,[1, 2] are among the few larger agencies using a family record. It is the urban agency that is called upon to provide multiple services at widely separated clinic locations which uses individual case records almost exclusively. In such a situation, a number of physicians and staff nurses are involved in the services given to each individual and to each family. Cross-references are too often only fortuitous, depending on memory during chance conversations of one staff member with another. It is in just such a situation that the family record becomes of paramount importance. In New York City, the size of the population base, the absence of social relationships obtaining in small well defined communities, and the diversities of services and clinics increase the need for integrating factors. The family record can be one such factor.

THE FAMILY RECORD IN RED HOOK

The family record in use in the Red Hook-Gowanus Health Center District since February, 1947, has been de-

veloped in conjunction with, and parallel to, the demonstration project of a completely generalized public health nursing service.[3] This demonstration, known as the Red Hook-Gowanus Community Nursing Service, has been a joint project of the Visiting Nurse Association of Brooklyn and the New York City Department of Health. It involves a complete integration of the public health nursing staffs assigned to this district by the Visiting Nurse Association and the Bureau of Public Health Nursing of the Department of Health.

The record in use can be characterized by the following statements:

1. It was developed with the guidance of a local records committee, consisting of the assistant directors of the two sponsoring nursing organizations and their statistical assistants as well as members of the staff of the Red Hook-Gowanus Health Center.
2. It developed out of a need of the project for a record which would facilitate to the greatest practical degree the focusing of nursing services around the family as the health and social unit.
3. The record was and still is considered, as is the rest of the demonstration, an empirical experiment in constant process of revision and development. For example, at the present time several extensions of the use of the record are being experimentally used in limited areas as follows:
   a. The medical records of the Maternal Hygiene Clinic and one child health station have been incorporated in the record folder.
   b. The record is being used extensively in two schools to determine its proper place in the school health service.

In developing the record, a major difficulty has been the fact that there are many special record forms of various sizes, shapes, and materials, used throughout the city for specific purposes by various bureaus of the Health Department. These forms are used for interdistrict communications or transfers and often cannot be altered to fit into a single folder. It should also be noted that there is no uniformity in the concepts of the several bureaus regarding the need for a unified family service involving their particular spheres of activity.

The record as set up, although called a "Family Record," is in reality a household record. Members of the family living outside the household (except in institutions) are not included. Included in the record are relatives as well as unrelated individuals living permanently in the same household. Where two distinct families temporarily occupy the same apartment, separate records are initiated with proper cross-references. The incorporation of the medical records is as yet limited to those of the Maternal Hygiene Clinic and of one child health station. Thus, most of the notations on the record are now made by public health nurses. It is expected that, as more of the medical records are included, the record will more truly fill the role of "family health record." The record is present at each physician's conference and a considerable degree of success has attended our efforts to stimulate the physician to use the material contained therein.

In the course of the period from February, 1947, to July, 1949, some 8,672 such records have been opened. They have been opened for services in one or more of the various clinics and for home visits; 5,690 records are now active for one or more members of the household; 2,543 records are now inactive because there are no services being given currently to any member of the household; 439 records have been completely terminated because the families moved from the district or because of the death of the last remaining member of the family.

In evaluating the record as a possible prototype of a record for general use throughout the city, it must be considered that some of the apparent advantages may partially stem from the parallel demonstration of an all inclusive generalized nursing service. It is obvious, however, that the generalized nurs-

ing service demonstration does not give rise to these advantages but merely exploits them to their fullest extent.

THE MANAGEMENT OF THE RECORD SYSTEM

A family record system involves a number of facilities providing for the distribution, collection, and filing of records. Records must be available to the clinics during the session when a member of the family has an appointment, and to the field nurse when she is ready to make a home visit. They must be returned immediately to the record room to be ready for use in another clinic, perhaps for another member of the family.

These facilities include the following:

1. A central record file which is a repository for records not in use at any particular moment
2. A system for calling for and transporting records so that they may be available when and where needed
3. A system for charging out records to insure their return
4. Scanning of records upon their return for completeness, for tallying desired information, and for noting pending action requiring subsequent use of the record

The Health Center district has been divided into forty nursing areas. The boundaries of each area correspond to those of census tracts. Thus, the population and its characteristics are known as indicated in the last census. The family records are filed according to these areas, each area's records occupying a single file drawer. This arrangement makes possible a rapid survey of the families being served in an area to determine the amount and quality of service these families are receiving, as well as to point up those aspects of health department activity which may require additional emphasis.

Within each area file drawer the records are filed in numerical order thus providing for the greatest simplicity and accuracy in the filing process. Each record, therefore, is given an area number as well as a family number. For example, the record of family number 89 in nursing area 24C is designated as 24C–089.

An alphabetical index of all the families served in the Health Center district is used to locate the family record. Each index card contains the family name, the address, the family record number, the first name of each member of the family, and, when indicated, cross-reference to other families or names.

At present the index cards are 3″ x 5″ printed paper slips. The time consumed in using this file and the occasional duplication of records due to faulty search of this file make the use of a visible index highly desirable.

Records are called for under a variety of circumstances. Three major procedures have been developed to fit these circumstances.

1. When a patient is to be admitted to a new service, either as a result of a request for a home visit or a new admission to a clinic, a search must be made in the index file to determine whether or not a family record is already in existence.
2. When a home visit is about to be made as a result of a plan noted in the record, the record is called for directly by record number as entered in the pending action reminder file. This file is a dated card file. The records indicated for each day are drawn from the file five days in advance. This file replaces the tally file used by the individual staff nurse in many nursing agencies.
3. The appointment sheet for each clinic session is sent to the record room five days in advance of the session. This sheet contains the family name and record number, thus permitting direct drawing from the record file.

Records drawn for home visits are placed in the boxes provided on each field nurse's desk. Records required in the clinic are delivered there at least one day prior to the clinic session. Records needed in clinics located outside of the Health Center building are transported by the regular messenger service of the

Health Department. Records are returned by the same routes.

In handling more than 8,600 family records covering an estimated 60,000 visits to 20,000 individuals, going to 6 clinics and over 40 field nurses, the urgent necessity of a foolproof accounting system is obvious. After much trial and error, the following system was devised: Included in each record folder are two charge out cards. On each of these cards is noted the date that the record is to be used and the nurse or clinic to whom the record is assigned. One card takes the place of the record in the file drawer. This card indicates the location of the record in case of a second request for the record before it is returned. The second card is placed in the charge out file. These cards are filed according to the week of removal. At the beginning of the third week, notice is sent to the clinic or field supervising nurse asking for an accounting. It is expected that within the week all records will be accounted for in one of three ways.

1. Returned to file.
2. Notation of need of record for one or two additional weeks.
3. Notation of need of record indefinitely.

At the beginning of the fourth week a list of all records unaccounted for in one of these three ways is sent to the district supervising nurse and to the health officer.

The operation of the record system requires the full time of four clerks. The activity is carried on in the service office of the Health Center. This office also contains the tuberculosis roster file and the desk of the stenographer responsible for correspondence regarding patients.

THE RECORD

The record is designed to provide the generalized public health nurse with a complete, easily accessible health picture of the family under consideration. It must be easily identified, capable of being carried in her nursing bag, and protected against deterioration. In accordance with these requirements the following elements were included in the record:

1. A folder, 6" x 9", is constructed of a good grade manila cardboard having two attached fasteners. One fastener on the forward flap holds the nursing record and one on the rear flap holds the medical record. The family name and number is affixed to the upper left hand corner of the rear and larger flap. A colored flag is affixed to the upper right hand corner of the rear flap to denote a specific public health problem in the family, e.g., dark blue for tuberculosis.
2. The nursing record consists of two face sheets and progress sheets. The first face sheet is divided into four sections.
   a. Identifying information—name of family, cross-reference to other family records, family number, address, and indication as to source of initial reference for nursing service.
   b. Family roster—the first names, age, sex, religion, marital status, occupation of each member of the household, and maiden-name of mother.
   c. Index of services—the name of each member of the family receiving service, the classification of this service, the date of admission, and date of termination.
   d. Social status of family—registration in social service exchange and member agencies, description of social and economic status of family.

This face sheet, therefore, serves to summarize for the person reading the record the composition of the family, its social status, and the type of health supervision being rendered to the several members of the family. One can immediately turn to that portion of the progress notes bearing on the health problem under consideration, as well as being aware of other health problems in the family.

The second face sheet is a summary of the communicable disease and immunity status of the family. In the first section it indicates the communicable disease histories, immunization procedures, results of cultures, chest x-rays and serological tests for each member of the family. In the second section there is

space for recording the progress of specific major communicable diseases, and in a third section space is provided for recording the summary of medical supervision of cases of tuberculosis.

The progress sheet is a record in chronological order of all nursing notes regardless of which member of the family is concerned. Columns are provided for the date, the name of the patient, T.P.R., the pending action with date, and the name of the nurse.

3. The medical records are attached to the rear flap of the folder. At present, the medical record of the Maternal Hygiene Clinic, the Baltic Street Child Health Station record, and interagency referral forms with medical orders are being attached to the record. Other medical records can be attached in the same way when the record forms are revised to the size of the folder.

SUMMARY

On the basis of the experience in the Red Hook-Gowanus Health Center District in New York City, the following conclusions can be drawn:

1. A family record is at least as important in a complex urban agency as in a single service or rural agency.
2. A system for efficiently handling a large volume of family records going to some 40 field nurses and 6 clinics has been developed.
3. The advantages of a family record of health department services are the following:
   a. Better medical and nursing service is made possible by the availability of a complete indexed record of health services to the family.
   b. Duplication of effort is avoided.
   c. Case finding is improved.
   d. Continuity of teaching is encouraged.
   e. Public confidence in health department activities is increased.
   f. Wasted medical and nursing time in clinics and unnecessary home visits is reduced.
   g. Information about the status of the family is accumulated.
   h. Better supervision is made possible.
   i. The basis is provided for statistical analysis of services.
   j. The health officer is given background for solution of individual case problems as well as for program planning.
4. The increased cost of such a record system stems from additional clerical salaries, equipment cost, rental for space, transportation, and supplies. It is obvious that the widened scope of the nursing visit and the improved case finding leads to increased need for nursing time.

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A Plan To Simplify Premarital Laws

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AT the present time, there are 38 states [1] and 2 territories requiring a premarital medical examination of both parties to an intended marriage. These states have attempted to put into legal language what is considered good medical practice in the United States.

The objective of the premarital law is one of syphilis case finding and, as a corollary to this, prevention of the spread of this disease to others. Thus the physician performing this examination may have two questions to answer:

1. Does the candidate for marriage have syphilis?
2. If he or she does have syphilis, is the disease in a stage or form that is communicable or potentially so? [2]

In attempting to answer these questions, a thorough history should be obtained and physical as well as laboratory tests must be performed. When all these data are compiled, the physician will not only be able to answer these two questions as a rule, but he will also have sufficient data to make a shrewd evaluation of the medical status (non-venereal) of the whole patient. This latter objective is not within the primary aim of the premarital law, but is a welcome by-product.

The first state premarital law was passed by Connecticut in 1935. Since then, a total of 39 states and 2 territories have passed premarital examination laws. In most of these states, the requirements of the premarital laws differ from each other in that some states require a physical as well as a blood test for syphilis; others just a blood test; some require an examination for both gonorrhea and syphilis; and still other states require an examination for venereal disease.

Furthermore, when a diagnosis of syphilis is discovered in either the prospective bride or groom, the case is handled in a different manner in most of the 39 states. This may vary from freedom to marry, once the non-infected partner is informed, to a refusal to issue a marriage license until an agreed-upon amount of treatment has been received, or permission to marry has been obtained from the state board of health, or a judicial authority, etc. With all

this disparity in the state premarital laws, it is no wonder that an individual and his family physician are confused and irritated when the former wants to be married in another state.

What happens when an individual wants to be married in a state other than that in which he is living or working? If he or she travels to that state early enough to see a local physician, and complies with the premarital laws of that state, there is no difficulty. However, if he plans to go to the other state a few days or a week before the wedding, as is usually the case, he looks to his family physician for the premarital medical certificate. When approached by his patient, the doctor wonders about the requirements of the other state, and this is about the time the venereal disease control officer receives a telephone call. Occasionally the state venereal disease control officer has the unpleasant duty of informing the family physician that his medical examination and signature on the premarital certificate will not be recognized by the state in which his patient plans to be married. Fortunately, however, 26 out of the 39 states will accept reports signed by out-of-state physicians.

When the family physician is informed that the out-of-state health department will accept his examination and signature, he is usually requested to send the blood sample to the state laboratory, because 36 out of the 39 states will accept results of these laboratories. The physician is also requested to record on the laboratory slip the name of the state in which the marriage will take place. This means that the state laboratory must keep on hand the premarital examination forms of every other state which requires that only its own premarital certificate be used, and at the present time, only 7 states will accept without question the forms of another state. It is not amusing to the state venereal disease control officer to recall how often the prospective brides and grooms have presented themselves to the city, town, or county marriage clerk of another state with such unacceptable forms.

The Venereal Disease Control Officers of the New England and the Middle Atlantic States recognize the problem and believe that in the interest of efficiency and better public relations, the following recommendations should be followed: All states and territories should adopt uniform or compatible premarital laws and agree upon a standard premarital certificate acceptable in any state or territory.

This subject was first explored at a meeting of the Venereal Disease Control Officers of the New England and Middle Atlantic States at Amherst, Mass., on June 14–15, 1948. We met again on March 23, 1949, at Boston. Out of this meeting came a group of recommended standards for consideration of the Public Health Commissioners of the New England and Middle Atlantic States. In general it was recommended that no state enact any premarital legislation which would be more stringent than that proposed, but at the same time, no state should feel deterred from drawing up more inclusive provisions. These recommended standards are:

1. That the scope of the examination be a physical examination and serologic test for syphilis.
2. That the approved tests include any serologic test for syphilis performed by the state department of public health, District of Columbia laboratories, laboratories of the Public Health Service and Armed Forces.
3. That these tests be valid for a period of thirty days prior to the issuance of the license.
4. That the acceptable laboratories be the state departments of public health and District of Columbia laboratories; laboratories of the Public Health Service and Armed Forces. It was suggested that individual states give favorable consideration to the provincial laboratories of Canada, and the laboratories of major cities, such as New York City.
5. That the medical certificate be signed by a

physician registered and or licensed (or both) to practice in any state or a commissioned medical officer on active duty in the Armed Forces or in the Public Health Service of the United States.

Following the preparation of these basic regulations, a suggested standard medical premarital certificate was devised (Figure 1). It was felt that this medical certificate could be used for intra-state purposes as well as for out-of-state marriages.

FIGURE 1

PREMARITAL HEALTH CERTIFICATE

I, ... of .....
(print or type name) (no.) (street) (city)
a physician registered or licensed to practice in..... in the State of
(city or town)
..... or a Commissioned Medical Officer of the Armed Forces or the
U. S. Public Health Service on active duty.....
(rank, service, serial number)
certify that on..... I examined .....
(month, day, year) (name)
of .....
(address)
This examination included a serologic test for syphilis taken on.....
(date)
and performed at..... on .....
(name and address of laboratory) (date)
It is my opinion that the applicant whose signature appears below is not infected with syphilis, or if infected, is not in a stage which is communicable.
Signature of Applicant:

....
(to be signed in presence of physician) (signature of physician)

6. That the premarital law prohibit the marriage when one of the parties has syphilis in a communicable or potentially communicable stage. Communicable syphilis will, therefore, be defined as primary, secondary, and early latent syphilis. When one of the partners to the intended marriage has syphilis in a communicable stage, it is felt desirable that the marriage be postponed until adequate treatment has been received and at least a two year successful post-treatment observation has been completed. However, in many instances it is not feasible to postpone the wedding for at least two years. In such instances the marriage may take place provided the infected partner has received adequate medical treatment, and furthermore, that the other party to the intended marriage has been informed of the nature of the disease in his or her intended spouse, the danger of relapse, and the necessity for faithful post-treatment observation.

SUMMARY

At the present time there are 39 states which have passed a premarital medical examination law. The problem of interstate marriages, due to the disparity in the laws of all these states, has been briefly outlined and a solution for this vexing problem offered.

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Incidence of Subclinical Poliomyelitis in an Urban Area According to Age Groups*

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WICKMAN recognized minor illnesses among the contacts of paralytic poliomyelitis cases.[1] His postulation that these were mild forms of the disease, necessary to explain its epidemiologic behavior, was echoed in 1913 by Frost. Frost intimated that the paralytic case may perhaps be considered as a complication or accident in the course of poliomyelitis; that the disease occurs throughout the world in an endemic form, particularly in large cities; that the population of the cities becomes immunized by subclinical infection early in life, usually before 5 years of age (since older children and adults are less frequently attacked); that the disease has the seasonal distribution of enteric and insect-borne diseases, but that it is transmitted largely by person-to-person contact.[2] Stocks estimated upward of 100 subclinical cases to each paralytic case in endemic areas.[3]

Evidence to support the above premises has gradually accumulated. Anderson and Frost reported that 1 of 5 normal adults and none of 3 normal children (ages 10, 11, and 16 years) had neutralizing antibodies to the Flexner strain of the virus.[4] Peabody, Draper, and Dochez found neutralizing antibodies in 3 (75 per cent) of 4 healthy physicians and nurses attendant on poliomyelitis patients, and in one healthy girl of 8 years, but not in one 2½ year old child.[5] Flexner, Clark, and Fraser,[6] and Kling and Pettersson[7] recovered virus from the nasopharynx of intimate contacts.

Netter and Levaditi, in 1910, found neutralizing antibodies after recovery in a child with leg and arm ache, and irritability (sister of a paralytic case, aged 6 years).[8] Taylor and Amoss, in 1917, recovered the virus from the throat of a child contact (white male, aged 10 years) several days before fever of short duration and diarrhea developed.[9] Others have since recovered the virus from the throat[10, 11, 29] or from the stools[12, 13, 29] of child contacts, without paralysis, stiff neck, or stiff back.

Monkey neutralization tests were performed between 1930 and 1935 for Aycock strain antibodies on sera from 12 infants, 39 children, and 8 adults in Boston,[14] on sera from 21 adults in Atlanta, Ga.,[15] on sera from 2 infants, 12 children, and 10 adults in Chicago.[16] A short time later, monkey neutralization tests were made for Flexner, and possibly other strains on sera from 60

* Work under the direction of Herman N. Bundesen, President, Chicago Board of Health.

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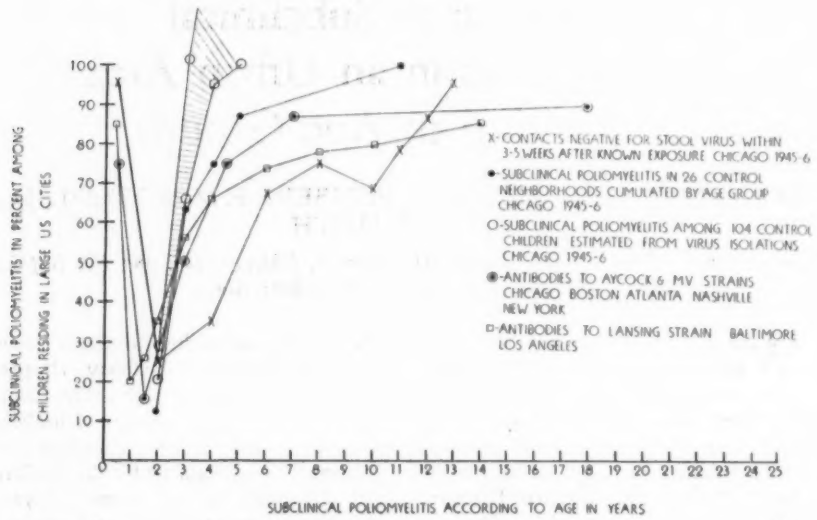
FIGURE 1—Subclinical poliomyelitis in urban areas of the United States as determined: (1) By virus isolation in control neighborhoods, (2) By sparing after virus challenge, and (3) by neutralizing antibody response.


SUBCLINICAL POLIOMYELITIS IN PERCENT AMONG CHILDREN RESIDING IN LARGE US CITIES
100
90
80
70
60
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
SUBCLINICAL POLIOMYELITIS ACCORDING TO AGE IN YEARS
X-CONTACTS NEGATIVE FOR STOOL VIRUS WITHIN 3-5 WEEKS AFTER KNOWN EXPOSURE CHICAGO 1945-6
•-SUBCLINICAL POLIOMYELITIS IN 26 CONTROL NEIGHBORHOODS CUMULATED BY AGE GROUP CHICAGO 1945-6
O-SUBCLINICAL POLIOMYELITIS AMONG 104 CONTROL CHILDREN ESTIMATED FROM VIRUS ISOLATIONS CHICAGO 1945-6
◉-ANTIBODIES TO AYCOCK & MV STRAINS CHICAGO BOSTON ATLANTA NASHVILLE NEW YORK
□-ANTIBODIES TO LANSING STRAIN BALTIMORE LOS ANGELES

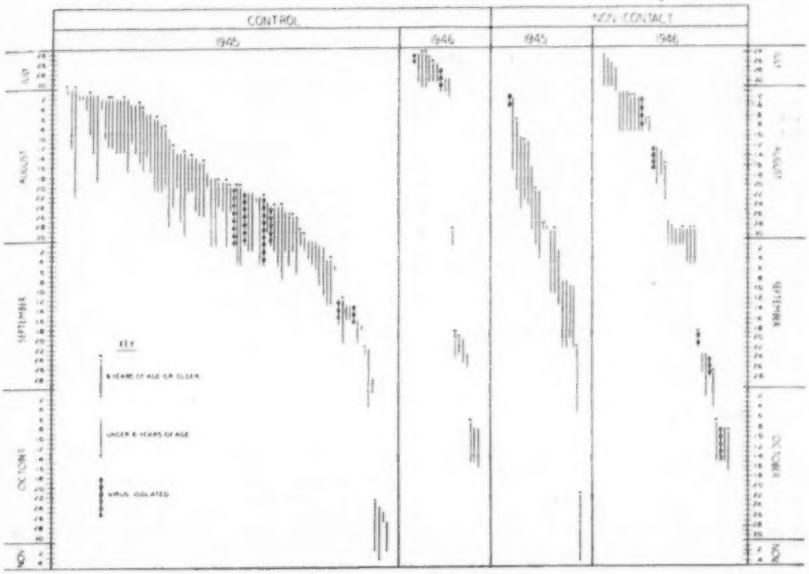
children and 34 adults in New York City,[17] on 4 adults in San Francisco,[18] and on sera from 25 adults in Nashville, Tenn.[19] The data on the above 14 infants, 110 children, and 102 adults were combined and plotted as a single curve (Figure 1).

Mouse neutralization tests for Lansing type antibodies were done on 303 normal children in Baltimore by Turner, Young, and Maxwell,[20] and on 104 normal children in Los Angeles by Pait, Kessel, and Grossman.[21] The curves according to age groups were identical within the limits of sampling error and were combined (Figure 1).

Melnick recovered poliomyelitis virus from sewage collected in four different areas of Chicago during the epidemic of 1943, but not after the epidemic had subsided. He likewise recovered virus from the New York City sewage during the late summer and fall of 1940, 1941, 1944, and in 1945, but not during any other periods of the year, nor in any part of the years 1942 and 1943. On the basis of 10,000 monkey infective doses per 100 gm. stool, he estimated that approximately 6 per cent of the population of Manhattan in New York City may have been carriers of poliomyelitis virus in the autumn of 1940, 1941, 1944, and 1945, unless some extra-human reservoir could be predicated.[22]

The cited experimental work indicated virus to be often present in the throat or stool of intimate contacts, and in urban sewage during late summer and fall, and a high incidence of neutralizing antibodies to be present with advancing age. However, direct quantitative studies of the actual incidence of the subclinical disease in an urban area during epidemic or nonepidemic periods, as evidenced by virus isolation and virus challenge, were lacking. The studies reported here were an attempt to determine the incidence of poliomyelitis infection in an urban area by direct virus isolations.

FIGURE 2—Stool collection intervals for 104 control and 55 non-contact children in 52 Chicago neighborhoods during 1945 and 1946, distributed according to virus recovery and to age of the children.



MATERIAL AND METHODS

Field studies of poliomyelitis in Chicago, during 1945 and 1946, included investigation of contacts and non-contacts of infectious cases in 26 patient neighborhoods and parallel studies in an equal number of control neighborhoods located systematically ten blocks north, south, east, or west of the patient neighborhoods (4 were 50 blocks distant).[23]

The technic of the field and laboratory studies has been described.[23, 24] The same virus technic was applied to stools collected from 104 children in the 26 control neighborhoods in 1945 and 1946. Some 231 monkeys were inoculated intraperitoneally, intranasally, and intracerebrally, and sacrificed when paralyzed or after 21 days had elapsed. The stools were collected over a 1–24 day interval averaging 8 days, both for those with and for those without virus isolation. The collection intervals during 1945 and 1946 (Figure 2), and the clinical and laboratory data (Table 1) are listed.

The various stools collected during 1945 and 1946 from 101 contact children were pooled for each child (same collection intervals as the above controls) and 2 monkeys inoculated as above from each pool. Some 224 monkeys were employed. The clinical and laboratory data on contact children with symptoms have been presented.[25]

As described before,[23] children residing within one block's radius of the paralyzed patient in the contact neighborhood and who had no history of contact with the patient in his infectious period, nor with any other neighborhood child during the 4 days before or after the onset of an illness compatible with poliomyelitis, were called non-contacts. Stools collected in the usual manner and during the same intervals were pooled, and 2 monkeys inoculated from each pool. Some 55 children and 118 monkeys comprised this series (Table 2, Figure 2).

TABLE 1

Clinical Symptoms and Recovery of Poliomyelitis Virus from the Stools of 104 Children from 26 Control Neighborhoods in Chicago During 1945 and 1946 (45 Children Without Fever or Symptoms and Without Pathology in the Monkeys Omitted)

Case	Name	CSA	Fever and Symptoms	Stools Collected No.	Stools Collected Date	1st Monkey F	1st Monkey P	1st Monkey HP	2nd Monkey F	2nd Monkey P	2nd Monkey HP
5–2	MaBeh	WM2	8/10, RN 0	10	8/ 3–12/45	0	0	0	0	0	0
5–3	GePas	WM2	7/30, RN 99.4	10	8/ 2–12/45	0	0	0	0	0	0
5–4	FrFar	WM11	8/1, C 0	1	7/31/45	0	0	0	0	0	0
5–4	ElKuc	WF1	0 9/22 Diphtheria Shots 0	3	8/ 1– 3/45	0	0	0	0	0	0
5–4	CaSwi	WF4½	7/30, C 99.8 8/20, H, ST, LA, 104	1	8/ 1/45	0	0	0	0	0	0
5–4	SaSwi	WF2	8/2, C 0	1	8/ 1/45	+	0	0	0	0	0
5–5	WmCur	WM2	0 8/13, 98.8; 8/14, 98.8	13	8/ 2–16/45	0	0	0	0	0	0
5–5	NeHof	WM3	8/7, C 0	6	8/ 5–13/45	0	0	0	0	0	0
5–5	DaQui	WF9½	8/11, C 0	7	8/ 4–16/45	0	0	0	0	0	0
5–6	JoBen	WM12	8/9, ST, C, V, RN 0	6	8/ 8–19/45	0	0	0	–	–	–
5–6	JoCza	WM1½	0 0	10	8/ 1–18/45	?+	0	0	0	0	0
5–6	SaDal	WF1½	8/7, C; 8/12, D 0	9	8/ 7–20/45	0	0	0	0	0	0
5–10	DoGed	WM4½	8/10, ST, F	10	8/13–26/45	0	0	0	0	0	0
5–10	CaEri	WF3½	8/16, H 8/15, 99.0; 8/16, 99.6	2	8/17–19/45	0	0	0	0	0	0
5–10	RoMar	WM1	8/5, RN, F; 8/26, H, ST	16	8/10–27/45	0	0	0	0	0	0
5–14	GeKad	WM6	7/7 Measles 8/18, H, ST, DR, C 101	6	8/14–20/45	0	0	0	0	0	0
5–14	JoKad	WF4	7/22 Measles 8/19, C 8/18, 98.8; 8/19, 99.6; 8/20, 99.2	6	8/14–20/45	0	0	0	0	0	0
5–14	RiKoz	WM1	0 None taken prior 8/13, 99.2	4	8/13–19/45	0	0	0	0	0	0
5–21	JuCol	WF12	10/2, Cg 0	4	8/19–9/1/45	0	0	0	0	0	0
5–21	PeGre	WF4	10/6, RN, Cg 0	1	8/22/45	0	0	0	0	0	0
5–21	EdGre	WF8	10/6, RN, Cg 0	3	8/19–23/45	0	0	0	?+	0	0
5–21	JaSoe	WM4	8/11, Cg 0	12	8/18–9/1/45	0	0	0	0	0	0
5–23	JaTay	WM4	8/20, "Cold," ST, C, H, DR? (Cg & RN neg.) 0?	8	8/21–31/45	0	0	0	?+	+	+
5–23	RiHer	WM10	8/23, "Cold" (Cg & RN neg.) 8/25, 98.8 None taken prior	6	8/22–9/4/45	0	0	0	0	0	+
5–23	RuMor	WF3	8/21, "Cold" 99.2 (Cg. & RN neg.)	7	8/21–9/1/45	0	0	0	?+	0	0
5–24	JoCut	WM3	8/21–8/25, C 0	6	8/20–9/1/45	+	0	+	?+	0	0
5–24	RoCut	WF15	8/28–9/1, C 0	3	8/24–9/1/45	0	0	0	0	0	0
5–39	JoMyr	WF3	9/6, ST 102	4	8/31–9/4/45	0	0	0	0	0	0
5–39	PaMyr	WF5	0 0	5	8/25–9/4/45	?+	0	0	?+	0	0
5–44	JoBro	WM2	9/6, C 99.2 Temp. not taken day prior or after	5	8/26–9/6/45	0	0	0	0	0	0
5–44	MaLig	CM2½	9/3, D; 8/26, 99.8; 9/4, 9/5, C; 9/5, 98.8, none later	2	8/24–9/4/45	0	0	0	0	0	0
5–44	RiLig	CF1	9/4, D; 9/5, C; 9/5, 99.2 Temp. not taken day prior or after	3	8/24–31/45	0	0	0	0	0	+
5–44	VaWal	CM7	0 9/7, 99.4	6	8/24–9/7/45	0	0	0	0	0	0
5–48	WmKos	WM6½	9/6, D?	3	8/29–31/45	?+	0	0	0	0	0
5–48	AnLam	WF10	H, V (?)	2	8/30–9/1/45	0	0	0	0	0	0
5–82	KaSte	WF½	8/22–8/26, V, ST, Cg 104	4	9/ 4–12/45	0	0	0	0	0	0
5–82	ThSte	WM9	8/20–8/26, ST, Cg 102	5	9/ 4–12/45	0	0	0	0	0	0
5–101	DoBra	WF8	9/12, 99.4; 9/14, 99.2	4	9/12–20/45	0	0	0	0	0	0
5–101	LoBra	WF3	8/30, V, ST 105	1	9/17/45	0	0	0	0	0	0
5–101	JuKin	WF2	9/12, C	3	9/15–20/45	0	0	0	0	0	0
5–103	ShBen	WF4½	6/15, Measles; 6/22, ST, F, H; 9/16, RN	3	9/13–15/45	0	0	0	0	0	0
5–103	WmBen	WM2	6/21, Measles 0 0	4	9/13–16/45	0	+	+	0	0	0
5–103	ElStu	WF2½	9/13, RN	4	9/12–16/45	0	0	+	0	0	0
5–103	JaWil	WM2	9/3, D; 9/15–21, RN, V, DR, Cg, C, F	2	9/13–15/45	0	0	0	0	0	0
5–203	RoSum	WM4	10/26–10/30, H, ST, C, RN, Cg 100–100.4	2	10/25–26/45	0	0	0	0	0	0
5–203	FrCho	WM2	10/26, D 100	5	10/22–11/1/45	0	0	0	0	0	0
6–1	StNor	WM2½	7/22, ST, C, DR, F	3	7/24–26/46	+	+	+	+	+	+
6–1	BeFri	WF10	0 0	3	7/26–29/46	?+	0	0	0	0	0
6–2	EuSte	WM4½	0 0	3	7/29–31/46	0	0	0	?+	0	0

TABLE 1 (Cont.)

Case	Name	CSA	Fever and Symptoms	Stools Collected No.	Stools Collected Date	1st Monkey F	1st Monkey P	1st Monkey HP	2nd Monkey F	2nd Monkey P	2nd Monkey HP
6–2	MaPoz	WF2½	0 0	4	7/27–31/46	?+	0	+	+	?+	+
6–2	JaRac	WM3½	7/2, V, C, RN, DR, F	3	7/26–29/46	0	0	0	0	0	0
6–6	RoMar	WM8	8/28, D	2	8/29–31/46	0	0	0	0	0	0
6–12	DaBic	WM2½	9/12, F, IR; 9/19–23, RN, Cg, C, D, W, F	3	9/20–24/46	0	0	0	0	0	0
6–12	StBic	WM6½	9/19, RN; 9/30, RN, Cg	3	9/19–23/46	0	0	0	0	0	0
6–12	BaBon	WM4	8/18, F, ST; 9/20, RN, Vc; 9/24, F, RN; 10/15, ST, RN, Cg, F.	3	9/23–25/46	0	0	0	0	0	0
6–12	ThHec	WM6	9/25, RN	3	9/20–22/46	0	0	0	0	0	0
6–13	GuWer	WM6	10/11, ST	4	10/ 7–14/46	0	0	0	+	0	0
6–13	RoWer	WM2	10/11, W, D, DR	4	10/ 8–15/46	0	0	0	+	0	0
6–13	DaSil	WM4½	0 0	6	10/ 8–14/46	0	0	0	0	0	0

Total 104 children, ages ½–18 yrs.: 0–1 yr., 1; 1–2 yrs., 14; 2–3 yrs., 22; 3–4 yrs., 10; 4–5 yrs., 17; 5–6 yrs., 4; 6–7 yrs., 7; 7–8 yrs., 4; 8–9 yrs., 3; 9–10 yrs., 5; 10–11 yrs., 9; 11–13 yrs., 4; 14–16 yrs., 3; 18 yrs., 1; studied in 1946—18 children, in 1945—86 children; collection period for stools varied 1–24 days in length (mostly 1–15 days), and averaged 8 days for both positive and negative VIRUS RECOVERIES; stool collections initiated July 31 in 1945, and July 24 in 1946; collections terminated November 3 in 1945, and on October 15 in 1946; F = Fever; P = Paralysis or Paresis; HP = Histopathology in spinal cord and in medulla; H = Headache; C = Constipation; DR = Drowsiness; Vo = Vomiting; ST = Sore or red throat; Cg = Cough; RN = Running nose; LA = Leg or muscle ache; D = Diarrhea; IR = Irritability; W = General weakness; Vc = Hoarseness or voice change.

RESULTS

Characteristic histologic lesions including neurocytophagia, perivascular collars, focal necroses, and other reactions of monocytes and neutrophiles were detected in the anterior or posterior horns of one or more levels of spinal cord and in the medulla of some of the 520 monkeys inoculated with stool specimens. (Following the inoculation, 56 monkeys died of trauma or of intercurrent conditions and a third monkey had to be substituted in each case, making a total of 576 animals actually used.) All histologic examinations were performed by the pathologist using the blind check method and duplicate slides cut on positive or doubtful cases for confirmation. A stool pool was considered positive if the characteristic lesions were encountered in one only of the two monkeys inoculated. The histologic lesions were found in each instance of observed paralysis or paresis in the monkey and, in a few instances, where no paresis had been observed.

Poliomyelitis virus was recovered from the stool of 8 (8 per cent) of the 104 children from the 26 control neighborhoods (Table 1, Figure 2), from 54 (53 per cent) of the 101 contact children,[25, 26] and from 6 (11 per cent) of the 55 non-contact children (Table 2, Figure 2) residing in the patient neighborhoods during 1945 and 1946. These have been distributed according to year and to age of the child (Table 3).

Of the 8 positive control children, 6 came from the 1945 and 2 from the 1946 study (Table 1). The stool inoculum from the 2 positive children in the 1946 study caused paralysis and characteristic lesions in both monkeys. The 6 positive children in the 1945 study came from four neighborhoods. In the two neighborhoods in 1945 having only one positive child, the diagnosis rested on characteristic histologic lesions in one monkey only. Fever or symptoms compatible with subclinical poliomyelitis[26] were noted in each child; and in one instance both monkeys inoculated with specimens from the child had a fever (Table 1).

Of the 6 positive non-contact children one was from 1945 and 5 from four different neighborhoods in 1946. Both monkeys were positive in stools from one of the 6 children; paralysis and/or fever was noted in each of the single positive monkeys and symptoms or fever compatible with subclinical poliomyelitis

TABLE 2

Clinical Symptoms and Recovery of Poliomyelitis Virus from the Stools of 55 Non-Contact Children from 18 Poliomyelitis Neighborhoods in Chicago During 1945 and 1946 (26 Children Without Fever or Symptoms and Without Pathology in the Monkeys Omitted)

Case	Name	CSA	Fever and Symptoms		Stools No.	Collected Date	1st Monkey F	1st Monkey P	1st Monkey HP	2nd Monkey F	2nd Monkey P	2nd Monkey HP
5–4	DiMur	WF4½	0	0	4	8/1–8/3/45	+	0	+	–	–	–
5–10	PaRam	WM3	0	RN, D	9	8/10–8/24/45	0	0	0	0	0	0
5–82	CaKor	WF1¼	9/8, 99.2 9/9, 99.4 9/10/99.8 9/11, 99.0 9/12, 99.0	V, RN, CG,D	7	9/2–9/12/45	0	0	0	0	0	0
5–101	MaLoz	WF4	9/7, 98.8 9/8, 99.4		4	9/9–9/19/45	0	0	0	–	–	–
5–101	JaHaw	WM2	0	ST, C, RN, CG	8	9/8–9/21/45	+	0	0	+	0	0
6–2	RoRud	WM4	0	H, SN	5	8/2–8/8/46	0	0	0	+	+	+
6–2	JeRud	WM10	0	C, DR	2	8/7–8/8/46	0	0	0	0	0	0
6–2	CaStr	WF1½	0	RN	6	8/1–8/8/46	0	0	0	0	0	0
6–2	EuStr	WM4	0	LA	2	8/6–8/7/46	0	0	0	0	0	0
6–2	MaKat	WF3½	0	RN, CG	5	8/2–8/8/46	0	0	0	0	0	0
6–2	JuCoh	WF3	0	ST	5	8/1–8/8/46	0	0	0	?	0	0
6–1	JoJus	WM3	0	V	4	7/24–7/30/46	0	0	0	0	0	0
6–1	LaLar	WM4	0	0	5	7/25–7/30/46	0	0	0	+	0	0
6–3	LaBry	WF6	8/10, 99.4 8/16, 101.2	RN, H	6	8/16–8/22/46	0	0	0	0	0	0
6–3	NaBry	WF2½	0	0	5	8/15–8/21/46	+	0	0	0	0	0
6–3	RoDun	WM5	0	V	5	8/12–8/19/46	0	0	0	0	0	0
6–3	RoEbe	WM3	0	0	5	8/13–8/17/46	+	0	0	0	0	0
6–3	AnTri	WF4	0	C	4	8/12–8/16/46	+	0	+	+	0	0
6–6	JoLin	WM6	0	CG	4	8/29–9/4/46	0	0	0	–	–	–
6–6	PhSan	WF5	Fever 7/23	H, ST, V, I	3	8/29–8/31/46	0	0	0	–	–	–
6–6	PaStr	WM2	0	RN, CG	3	8/28–8/31/46	0	0	0	0	0	0
6–6	PeStr	WF4	0	RN, CG	5	8/27–8/31/46	0	0	0	–	–	–
6–12	IdBoe	WF4½	0	RN, CG	3	9/24–9/27/46	+	0	0	0	+	+
6–12	RoDub	WM4	0	LA?	4	9/23–10/1/46	0	0	0	0	0	0
6–12	LeFra	WF7	9/19, 99.2	H, ST, DR	3	9/19–9/21/46	+	+	+	+	+	+
6–12	BoKle	WM6	9/27, 101.6	RN, CG, Red Throat	5	9/27–10/3/46	–	–	–	0	0	0
6–13	MaHau	WF2	10/8, 99.0	Tired	6	10/8–10/14/46	0	0	0	0	0	0
6–13	ChPec	WF4	0	H, ST?	5	10/8–10/14/46	+	+	+	–	–	–

TABLE 3

Isolation of Poliomyelitis Virus from the Stools of Urban Children According to Age Distribution

Age in Years	Control Children 1945 +	Control Children 1945 –	Control Children 1946 +	Control Children 1946 –	Control Children Total +	Control Children Total –	Contact Children 1945 +	Contact Children 1945 –	Contact Children 1946 +	Contact Children 1946 –	Contact Children Total +	Contact Children Total –	Non-Contact Children 1945 +	Non-Contact Children 1945 –	Non-Contact Children 1946 +	Non-Contact Children 1946 –	Non-Contact Children Total +	Non-Contact Children Total –
0		1				1		2		1		3						
1	1	11		2	1	13	2		1	1	3	1		1		1		2
2	2	16	2	2	4	18	3	2	5	1	8	3		2		4		6
3	1	8		1	1	9	8	2	8	2	16	4		3		6		9
4	1	13		3	1	16	2	2	6	3	8	5	1	6	4	6	5	12
5		4				4	3	2	4	3	7	5				3		3
6		3		4		7	2	2		4	2	6				4		4
7		4				4	4	1		3	4	4		3	1		1	3
8		2		1		3		1		1		2				1		1
9		4		1		5	1			1	1	1		1		2		3
10	1	6		2	1	8	1	2			1	2				2		2
11		1				1	1	4		2	1	6		1				1
12		3				3	1	1	1		2	1		1				1
13							1				1							
14		1				1				1		1				1		1
15		1				1		1				1		1				1
16		1				1												
17								1				1						
18		1				1												
26										1		1						
Total	6	80	2	16	8	96	29	23	25	24	54	47	1	19	5	30	6	49

among 4 of the 6 children (Table 2).

Thus, of the 14 positive non-contact or control children, both monkeys were positive in only three instances, possibly indicating minimal amounts of stool virus in the inoculum. Thus, at least 2 monkeys and the triple inoculation method [24] and careful histologic examinations are indicated in sampling studies of controls and non-contacts. Only 9 of the 14 non-contact and control children had observed symptoms or fever compatible with subclinical poliomyelitis during the 2 week observation period.

TABLE 4

Estimated Annual and Estimated Cumulative Incidence of Poliomyelitis Among 159 Control and Non-Contact Children in Chicago According to Age Groups

Age Yrs.	Children Studied	Virus Recovered	Estimated Poliomyelitis Infections			
			Current	Prior	Cumulative	Per Cent
0	1	0	0	–	–	–
1	16	1	4	–	4	25
2	28	4	16	7	23	82
3	19	1	4	15.6	19.6	103
4	34	6	24	35.0	59.0	174
5– 7	26	1	4	45.2	49.2	189
8–10	23	1	4	43.5	47.5	206
11–26	12	0	0	24.7	24.7	206
Total	159	14	56	–	327.5	206

DISCUSSION

The poliomyelitis incidence of 11 per cent among the non-contacts in the patient's neighborhood was within the limits of sampling error of the poliomyelitis incidence of 8 per cent observed among the control children residing in neighborhoods 10 blocks distant. Because some neighborhood histories were undoubtedly incomplete, an incorrect classification of some non-contacts might explain the 3 per cent difference, when not due to sampling alone. Nevertheless, the viral data support conclusions already published [23] that the high incidence of poliomyelitis among the known contacts of infectious paralytic cases was due largely to person to person transmission of the virus. The data formerly or herein presented offer no direct information as to whether the widespread subclinical disease among the control and non-contact children was transmitted by person to person contact or by some other means (insect or otherwise).

It may be that poliomyelitis infection in the families of paralytic patients represents instances of overwhelming virus contact (or challenge) and as such may bear little relation to the epidemiologic or immunologic conditions in the control neighborhoods and among non-familial contacts. Thus hypotheses based on such observations [27] may have an inherent fallacy.

In the Chicago studies, care was taken that the large proportion of the contacts were non-familial; thus, 18 were familial (brothers, sisters, parents, children) and 83 were non-familial. Of the 10 familial contacts, 1–5 years of age, 8 (80 per cent) were positive, and 38 of the 49 non-familial contacts (78 per cent) were positive. However, among 8 familial contacts, 6 years of age and older, 6 (75 per cent) were positive, whereas only 7 (23 per cent) among 30 non-familial contacts of similar age were positive. A low virus recovery rate among non-familial contacts 6 years of age and older may be characteristic of an urban population subjected to normal virus challenge. A similar age trend may be noted among the controls and the non-contacts (Table 3).

Since the virus challenge among the 101 contact children may represent several strains of virus, the per cent of negative children for each age group may approximate the average immunity to poliomyelitis virus of whatever strain (Figure 1). This sparing curve among the contact children is closely related to the neutralizing antibody titers for Lansing, and for Aycock and Flexner strains (Figure 1).

Consequently, it should be noted that an incidence curve of subclinical poliomyelitis cumulated for age groups among the control children according to the method used by Howe for paralytic poliomyelitis [28] shows universal infection with one or several strains (prevalent in 1945–1946) of poliomyelitis virus by 10 years of age (Figure 1). This curve is in fair accord with the virus challenge curve among the contacts and with the neutralizing antibody curves. It may be higher because errors in the history of contact during the infectious period would result in a skew to the right in the sparing curve, and because definite virus challenge is a more vigorous test than indefinite virus challenge, and may offer a greater chance for secondary reinfections.

Between July 24 and August 18, inclusive, and between September 19 and November 3, inclusive, during 1945 and 1946, the entire stool collections on 50 of the control children were made. The pooled specimens from two of the children were positive (4 per cent). Since the stools were from periods separated 1–3½ months apart, it may be presumed that, if stools had been collected on the children examined between July 24 and August 18, inclusive, during September 19 to November 3, and, vice versa, those collected between September 19 and November 3, examined between July 24 and August 18, the yield would also have been 2 positives but different children from those observed. Consequently, the actual positives on the 50 children were probably 4 during these collection periods in a single year, or 8 per cent.

Between August 19 and September 18, inclusive, the stool specimens on the remaining 54 children were partially or completely collected. There were 6 positives, or 11.1 per cent. This period corresponds with the highest incidence of the clinically reported disease in Chicago during 1945 and 1946 (380 of the 994 reported cases). Presumably, if the 54 children had been examined between July 24 and August 18, and between September 19 and November 3, respectively, 8 per cent different children (4.3) might have had recoverable virus in the stools, and, likewise, had the other 50 children been examined between August 19 and September 18, some additional 11 per cent, or 5.5 children, might have had recoverable virus. Thus, some twenty (19.8) of the 104 children probably had recoverable stool virus in a single year. Of the 994 clinical cases of poliomyelitis reported in Chicago during 1945 and 1946, some 884 (85 per cent) occurred during the period of stool collections. An additional 15 per cent of the total subclinical cases may well have occurred during the period from January 1 to July 24, and November 3 to December 31. This was probably offset, however, by overlapping during the collection period, since between the 4th and 8th weeks after onset in the subclinical and clinical disease, virus may be recovered in about 15 per cent.[25]

When stools were collected on the day of or on one day prior to onset in 83 cases of subclinical poliomyelitis, virus recovery was 83 per cent and 94 per cent respectively [25]; but for the period between 1 week prior to 3 weeks after onset of the first fever or symptom compatible with subclinical poliomyelitis, the virus recovery was 63 per cent.

Thus, with only 63 per cent virus recovery during the optimal period (1 week prior to 3 weeks after onset), the

actual incidence of poliomyelitis was probably not 19.8 among 104 children, as estimated, but 32 (19.8 divided by 62.8 per cent = 31.8). Among the 159 control and non-contact children, 14 (8.8 per cent) were positive (Table 3), and 12 of the 14 were 1–4 years of age. The observed incidence might be multiplied by 4 as calculated above, to obtain the estimated incidence per year (Table 4, Figure 1). The annual estimated incidence added to the calculated prior incidence for each year would indicate that almost every child in Chicago has probably had poliomyelitis infection once by the 4th birthday, and over 75 per cent would have had the disease twice by the 6th birthday (different strains or multiple infection), and virtually every child twice by the 10th birthday (or between 100,000 and 125,000 cases annually in the city, or 3–4 per cent of the total population). If the off-season cases be more numerous than now estimated (current studies are in progress to estimate winter poliomyelitis), or if the stool virus recovery period be shorter among subclinical cases without recognizable symptoms,[25] then the total poliomyelitis incidence rate (whether different strains or reinfections) would be higher than now estimated.

Paralysis in poliomyelitis representing a condition occurring less than once in each 200 cases may be a reinfection in sensitized individuals, or in individuals with poor natural or acquired resistance. Repeated paralytic disease, sometimes fatal, has been encountered in our field work, and the low antibody titer after paralytic disease reported previously[29] may not always be due to strain differences. The significantly increased incidence of residual paralyses in clinical cases over 7 years of age[30] may represent a constitutional reaction to delayed contact with a strain of virus usually encountered during the preschool period, as well as to possible sensitization from prior infection.

The mode of transmission of poliomyelitis among the 159 controls and non-contacts was not directly established. However 9 of the 14 from whom virus was recovered were known to have had fever or symptoms compatible with subclinical poliomyelitis.[26] At least 94 per cent of such cases had recoverable virus in the stool on the day prior to onset in a quantity comparable with that in the clinical or paralytic disease.[25] In addition, 5 of the 14 had fever and two or more symptoms compatible with poliomyelitis including headache, leg or neck ache, sore throat, etc. Current work has shown that almost 100 per cent of such children have virus in the throat as well as in the stool on the day prior to onset.[31] In terms of the epidemiology of the disease this would indicate that annually in Chicago during the summer and fall some 40,000 children have virus in the throat and in the stool on the day before onset in a quantity comparable to that found on a similar day in the clinical or paralytic disease and at least an additional 32,000 children have virus in the stool but not in the throat on the day prior to onset. Ninety per cent of this great reservoir of the disease is represented by the ambulatory preschool child 1–5 years of age who probably brings poliomyelitis home to his parents and older brothers and sisters rather than vice versa. The child with throat and stool virus need on the average infect only 3 others to account for all of the estimated poliomyelitis. Neighborhood studies have proved that such a type of spread actually takes place.

SUMMARY

Stools were collected in Chicago during 1945 and 1946, from 260 contact, non-contact, and control children. From the stools, a total of 576 monkeys were inoculated. Virus was recovered from the stools of 54 of 101 contact, 6 of 55 non-contact, and 8 of 104 control children. Twelve (86 per cent) of the 14

positive non-contact and control children were 1–4 years of age. Eight (80 per cent) of 10 familial contacts and 38 (78 per cent) of 49 non-familial contacts, 1–5 years of age, were positive; 6 (75 per cent) of 8 familial contacts and 7 (23 per cent) among 30 non-familial contacts, 6 years of age and older, were positive.

It was calculated that most children in Chicago had probably had poliomyelitis once by the 4th birthday, and 75 per cent perhaps twice by the 6th birthday, either different strains or reinfection. From these calculations it would appear that on the average over 100,000 to 125,000 cases of poliomyelitis occur in Chicago each year, or 3–4 per cent of the total population.

There is a similarity in the estimates of poliomyelitis infection in urban populations in relation to age, whether determined by virus isolation, by sparing after virus challenge, or by neutralizing antibody response.

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A Coördinated State Program for Chronic Illness*

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CHRONIC disease has been defined for administrative purposes as: "a disease that may be expected to require an extended period of medical supervision or hospital, institutional, nursing, or supervisory care." Since it is reasonable to expect that the problem of the acute communicable diseases will be reduced markedly in the immediate future, increased attention is now being focused on the extent and seriousness of the chronic diseases. Planning to meet the problem of chronic illness has so far been limited to a few areas or to a few of the essential phases of a completely coördinated program. There is a definite need for overall planning which will serve as a guide to the development of specific programs and prevent overlapping and confusion, and which will provide an integrated service program to those who are afflicted with a chronic illness. The development of a plan for the care of the chronically ill cannot be separated from community planning for medical and health services. There are, however, many important aspects in the development of a plan for the chronically ill which could go beyond the ordinary planning inherent in the public health programs. Such planning should include the provision of hospital facilities, intermediary care in private and public nursing homes and infirmaries, medical and nursing services in the home, outpatient clinics, health protection or multiphasic screening clinics, and housekeeping services. In addition, the plan should provide research in prevention, care, and rehabilitation of the patient, in the administration of programs and in the education of the medical profession and the public as well. It should take into consideration not only income replacement but also the provision for the cost of providing prolonged medical care. Finally, there should be a provision for the study of the motivations which stimulate people to action. The importance of psychosomatic factors in the development of a coördinated program for the chronically ill is apparent to those who remember that the chronic diseases are largely those in which emotional factors are of etiological diagnostic and therapeutic importance. The program, therefore, should include an analysis of the psychosomatic elements which contribute to the development or progress of chronic disease in the community as a whole as well as in the individual. For those who are already afflicted with a chronic disease, the program must provide for changing their total outlook upon life. Too many of them have become so accustomed to being disabled that they unconsciously will their disability to continue and are not willing to face the hazards of the competition which a self-sustaining citizen must be ready to meet in everyday life. For these, not only is there need for vocational rehabilitation but also for mental and social rehabilitation.

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MAJOR EXTENT OF CHRONIC ILLNESS

Chronic disease affects practically every family. It is estimated that each year chronic disease causes nearly 1 million deaths and 1 billion days of disability. Victims of these diseases occupy approximately three-quarters of a million hospital beds and receive the equivalent services of at least one-third of the doctors. Over 25 million persons suffer from some disabling or nondisabling chronic ailment. Measured in any terms the chronic diseases are a staggering national burden, a major source of insecurity and of loss of national income. The most important of the chronic diseases are heart diseases, arteriosclerosis, high blood pressure, nervous and mental diseases, arthritis, kidney disease, tuberculosis, cancer, diabetes, and asthma. Although the incidence of chronic disease increases with age and the progressive aging of our population is one of the factors responsible for the growing importance of the problem, it is important to remember that chronic illness occurs at all ages. Over one-half of the chronically ill are below the age of 45 and about 16 per cent are under 25 years of age. More than three-quarters of the persons afflicted with chronic disease are in the productive years from 15 to 64. The prevalence of chronic disease was determined in the National Health Survey by a study of 2,800,000 persons made by the Public Health Service in 1935 and 1936. In this investigation the Public Health Service attempted to record in one visit the illness experience of each family for the preceding year. Rheumatism led the list with almost 7 million cases in the United States in 1935. Heart disease, diseases of the circulatory system, allergic diseases account for more than 3 million cases each. Moreover, the Public Health Service found that chronic disease caused almost a million deaths in 1940. The great killer was heart disease which was responsible for 385,000 deaths, and cancer came next with 165,000 deaths. Hypertension and arteriosclerosis came third with almost 150,000 deaths. Taken as a group the cardiovascular diseases are among the leading causes of both disability and death and undoubtedly the most important group of chronic illness with which the program must deal.

Such mortality figures tell an incomplete story. The morbidity and disability from chronic diseases account for untold prolonged misery and destitution far beyond that which any statistical analysis can possibly reveal. In no state is there an accurate estimate as to the prevalence of chronic illness, and yet chronic illness is a major factor in causing families to seek public relief.

PREVENTION

As in other fields of public health the basic approach to chronic diseases must be prevention. Unless programs diminish effectively the prevalence of chronic disease, what is the outlook for the future? The incidence of chronic disease is increasing rapidly. This is a direct result of our aging population. We must realize that the middle-aged and old people of 1980 are already here. In 1900, 1 person in 25 was 65 years of age or older; whereas, in 1980 1 in 10 will be over 65. While today there are some 25 million persons with a chronic disease or permanent impairment, it is estimated that there will be about 40 million such persons by 1980. In 1900 the major chronic diseases were responsible for 30 per cent of all deaths in the death registration area. In 1940 they were responsible for 64 per cent of all deaths in the United States. The rates for diabetes, cancer, and heart disease have practically doubled since 1900. If the trend continues, by 1980 total deaths from diseases of the heart, diabetes, and cancer will be almost double what they were in 1940. Obvi-

ously, with the increased prevalence of diseases which cause prolonged disability, and extended social and economic dependence, there will be in turn a need for an increase in both medical and hospital facilities and a greater demand for more extensive social and economic assistance. Obviously, therefore, it is to the interest of all concerned — the official and the voluntary health agencies, the hospitals, the professions and the public as well — to initiate as promptly as possible all measures which will bring about a reduction in the prevalence of chronic illness.

The most important method of preventing chronic illness is the promotion of optimal health. All public health programs need to be strengthened through the further development of such programs as nutrition, mental health, and housing; through the provision of more adequate preschool and school health programs, with facilities for the correction of defects as soon as they are discovered; and finally more comprehensive education programs to motivate people to seek assistance early.

Many states have initiated programs for the conservation of the lives of premature infants and for the health supervision of infants and children. The success of these programs suggests that the same type of health conservation program can also be directed to adolescents and adults. The health programs of our high schools and colleges should include: adequate medical screening or examinations, the correction of defects, programs for physical fitness and recreation, and finally the education of individuals to live healthful lives and to take advantage of health measures as they are made available even before a departure from normal health is apparent.

The health protection clinic or, as it is more apt to be called in professional apothegm, the multiphasic screening clinic, is a newly developed technique for the examination of apparently well persons who are interested in their health, but for one reason or another do not obtain continuous care and supervision from the family physician. At a single visit, with a minimum of time and expense, the health protection clinic can screen for the presence of the major conditions which may lead to serious protracted illness, disability, or untimely death. The early detection of such diseases as hypertension, heart disease, diabetes, tuberculosis, nephritis, cancer, syphilis, and anemia by simple screening techniques is made possible. Patients with positive findings should be referred to their family physician, or to a clinic if they cannot afford a physician, for a complete examination and treatment. The incidence of complications, long-term care in hospitals or at home, and serious loss of earning capacity are thereby reduced. The objective of these clinics is to keep the people well and on the job and thereby reduce illness, welfare loads, and unnecessary deaths to an absolute minimum. The procedures in the health protection clinic are for screening purposes only and are as follows: first, a complete history; second, a recording of the blood pressure, height, weight, temperature, pulse and respiration; third, a 70 mm. chest x-ray; fourth, a blood test including hemoglobin determination, sugar screening, and a serological test for syphilis; fifth, urinalysis for albumen and sugar; and sixth, vision and hearing tests. A physician is required for legal and administrative purposes and in the interpretation of these results and their presentation to the family physician for final diagnosis, follow-up, and treatment. The time is rapidly approaching when the categorical approach, such as the screen for tuberculosis as exemplified in the mass x-ray for tuberculosis, the cancer detection clinic, and the diabetic detection program, will be eliminated as in-

dividual programs and combined in the health protection plan. Health departments through health centers and community hospitals can thus give an additional service to the people. The need of this service is well illustrated by the experience in Massachusetts. A single newspaper release announcing the opening of the health protection clinic was answered by over 3,000 phone calls, and numerous letters far exceeded our expectations and facilities.

Many large industrial and mercantile organizations already are providing for periodic medical examinations of their employees. If periodic examinations or screening are good for children and for employees of large concerns, such a procedure should be made available to every citizen.

RESEARCH

Additional research is needed in the clinics, in the laboratories and in the various techniques and procedures of providing services on the local level. Massachusetts is developing a chronic disease center which will be a teaching and research center for our three medical schools, for the school of public health, and for the training of licensed attendants and specialists in medical social work and other related fields. This center will act as a nucleus not only in the field of research but also in the field of the training of graduate physicians and other practitioners who may return for postgraduate training. In addition there must be developed affiliated facilities for case findings, and follow-up clinics throughout the state. The provision of a key research center on a regional basis is fundamental to progress in the field of cancer, heart disease, rheumatism, arthritis, diabetic, and other categorical diseases. The combined efforts in all aspects of research, by health departments and voluntary health agencies, is the keystone to the arch of successful bridge building in the chronic disease program.

Research is also necessary in evaluating the economic, social and psychosomatic aspects of chronic illness. In New York City the services of the Goldwater Memorial Hospital have carried on important research in kidney disease, arteriosclerosis, malaria, and cirrhosis of the liver. In Illinois the State Commission on the Care of Chronically Ill Persons is considering the advisability of developing a state sponsored university research institute for the study of chronic illness which would, in addition to suitable research facilities, provide beds for 200 patients and an outpatient service for 1,500 patients a year. The Public Health Service through its various demonstration projects throughout the country, such as the heart demonstration projects in Framingham and Newton, Mass., and the obesity control program in Boston, is assisting states in the development of community programs for the control of chronic diseases. As soon as these demonstration projects have proved their value they should become integral parts of a well rounded program for chronic diseases.

HOME CARE

A large number of persons who are chronically ill can be cared for either in the home, in the physician's office, in a clinic, or a combination of these. It is not only impractical but unwise to place all who are chronically ill in an infirmary or hospital. Patients prefer to stay with their families whenever possible. In order to provide an adequate type of home care it is necessary to expand public health and visiting nurse services to include bedside nursing. In addition to increasing the number of public health nurses, there is need to train them to provide valuable assistance to physicians in the time-consuming task of educating the individual patient or his family in the proper understanding and care of

chronic illness. Greater emphasis should be placed upon the use of licensed attendants or practical nurses or nurses aides working under the supervision of public health registered nurses. Housekeeping services should be made available in the home care of the chronically ill. The well rounded home care program also includes adequate housing to assure a healthy and happy environment in which to live.

CONVALESCENT AND NURSING CARE

The shortage of institutions for nursing care of the chronically ill is apparent in every community. Yet such convalescent care undoubtedly conserves hospital beds and performs important therapeutic and preventive functions. Following a flare-up of illness in a chronically ill patient, adequate convalescent care may lead to complete or partial rehabilitation and may help to delay the progress of the underlying chronic illness. On the whole there has been insufficient appreciation of the value of convalescence and rehabilitation in the care of the chronically ill. Planned convalescence and rehabilitation are particularly important — the chronically ill must be made conscious of their limitations early in the course of the disease, and many of them must be trained for new occupations so that they may remain within the limits of activity advised for their illness and yet maintain economic independence. In addition, such rehabilitation should coordinate the mental and social aspects with the physical phase of the program. The provision of adequate convalescent facilities, either jointly with chronic disease hospitals or wings of general hospitals or in close affiliation with them, is a necessary portion of a rounded chronic disease program.

HOSPITAL CARE

While there is a definite need for large teaching research centers in the field of chronic disease, the community should not plan a separate chronic disease hospital but should integrate its chronic disease unit in a general community hospital. Such a hospital should have adequate departments for physical medicine, occupational therapy, and mental, social, and physical rehabilitation. There should be separate units to provide recreational facilities, educational facilities for children, and social and psychological service for chronically ill patients who may require prolonged hospitalization or repeated visits to the outpatient clinic. On the other hand, the long-term patient requires less costly care than the acutely ill. It is estimated that unless hospital care for a chronically ill patient can be provided at a daily cost equal to about three-fifths of the cost for a patient in an acute general hospital of high standard, the continued care of the long-term patient in a bed intended for one who is acutely ill is wasteful. General hospitals should be constructed with wings especially designed for the care of the chronically ill, where the special needs and problems of this group are not lost in competition with the urgent and dramatic needs of the acutely ill. Under no circumstances should such chronic disease wings be limited to the indigent. High standards will be maintained most effectively if facilities are geared to meet the requirements of the entire community. Moreover, the admission of patients who are able to pay will reduce the need for public funds.

REHABILITATION

It is not enough to discharge a tuberculosis patient as an arrested case and return him to the community. Such a patient must be carefully observed over a long period of time for signs of reactivation of the disease process. Moreover, there may be need for social as well as vocational rehabilitation of that

patient. The patient may require training in an occupation which is not likely to bring about a breakdown of his former disease process. Job placement facilities may be necessary. Moreover, in order to relieve the patient of the worry of the economic and social welfare of his family it may be necessary to assist his family economically. Similarly, in heart disease, arthritis, or cancer, a follow-up service should be provided as well as vocational and social and economic rehabilitation. It is not enough merely to offer a patient an arrested or a controlled physical cure, but he must be furnished all the other appurtenances which make it possible for him to remain a self-sustaining, self-respecting citizen.

In short, a coördinated medical care program for the chronically ill should recognize that:

First, the care of the chronically ill is inseparable from that given to those with acute illness.

Second, major emphasis must be put upon the coördination and integration of all services. A person who is chronically ill may have acute exacerbations of his illness or may have concurrent acute illnesses of an entirely different type. Since the medical condition of the chronically ill person is not static, it is essential to develop smoothly operating mechanisms for referral from one type of care to another.

Third, the facilities for the care and rehabilitation for the chronically ill should be planned for the community as a whole, and not for the indigent alone. Chronic disease strikes all sections of the population and if the chronically ill person is not indigent when he becomes ill, it is merely a matter of time until he does need economic assistance. The facilities for chronic disease should be associated with general hospitals which are community institutions serving all sections of a population. They will thereby achieve greater financial stability and at the same time be able to utilize the more complex diagnostic and therapeutic facilities which are available in a large general hospital.

Fourth, the medical care and rehabilitation of a chronically ill person depends to a large extent upon the state of his illness. Major emphasis should be placed on home care with the provision of housekeeping services, bedside nursing, home medical visits, and the availability of physical therapists, speech therapists, and other experts when indicated. There should be a coördination of this home care program with hospital and convalescent care and rehabilitation services so that persons may be treated in outpatient departments of large institutions and still remain as an integral part of their family circle.

Thus a coördinated program for chronic illness is set up, including prevention, research, medical care, convalescent and nursing home care, rehabilitation care, the education of both the patient and the public, and lastly of the profession as well.

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Viability of *Escherichia coli* in Sea Water*

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THE distribution of coliform bacteria in tidal waters has both public health and economic significance. In recent years more and more shellfish waters and bathing beaches have been closed because of pollution. It has been estimated that by 1948 over 60 per cent of the clam producing flats in Massachusetts had been closed.[1] There is every indication that the problem will become more acute with the increased utilization of ocean outfalls for the disposal of sewage.

Polluted harbors and estuaries contain many thousands of bacteria in every milliliter of water. A large proportion of these may be of enteric origin. As one proceeds toward the open sea the numbers decrease within a few miles to a few hundred cells per ml. and no enteric bacteria are found. The question thus arises as to the fate of the enormous numbers of enteric bacteria which enter coastal waters daily by way of tidal rivers and ocean outfalls. Dilution of the effluent with sea water is important in diminishing the bacterial population, but we have found that the numbers of coliform bacteria decrease much more rapidly than can be accounted for by dilution alone.[2]

The literature contains many and varied explanations for the low numbers of enteric bacteria in the sea. Arloing, *et al.*[3] and d'Herelle[4] emphasize the importance of bacteriophage. Rubentschik[5] and Waksman and Vartiovaara[6] discuss the sedimentation and absorption of bacteria by marine bottom sediments. Gaarder and Spärck[7] have considered the bactericidal effect of sunlight. Waksman and Carey[8] suggested that consumption of bacteria by predators may be important in maintaining low populations. ZoBell[9] postulated toxic substances inimical to coliform bacteria under natural conditions, and Waksman and Hotchkiss[10] have indicated the possibility of antagonistic relationships between natural and adventitious forms. The contradictory evidence for bactericidal activity of sea water has been adequately summarized by ZoBell.[11]

A previous publication[2] from this laboratory stated that sea water was bactericidal to *Escherichia coli;* that autoclaving the sea water destroyed most of its activity; that a second inoculation of *E. coli* died off more rapidly than the first; and that under natural conditions the effects of dilution were not sufficient to account for the disappearance of adventitious bacteria in tidal estuaries.

This paper summarizes the results that have been obtained during a study of the seasonal changes of bactericidal activity of sea water throughout a com-

* Contribution No. 506 Woods Hole Oceanographic Institution.

plete year. The effects of various treatments of the water, such as storage, autoclaving, boiling, adding organic matter, pasteurization, and chlorination are also described. The results of these various treatments indicate that the bactericidal property of natural sea water depends upon the presence of the native marine bacterial flora.

The primary objective of this investigation has been to develop a background of information which will be useful in interpreting the distribution of enteric bacteria in tidal waters. This information, when combined with complete hydrographic studies, permits the evaluation of dilution and mortality under natural conditions. When these two processes are accounted for, the importance of the other factors may be assessed.

METHODS

Samples of sea water to be tested for bactericidal activity were collected from Vineyard Sound, 2 miles from the nearest shore, and were filtered through paper to remove larger organisms and detritus. All of the samples used gave negative coliform tests when 1 ml. of the water was inoculated into lactose broth tubes. Each sample was divided into twelve portions, four of which were untreated (raw water), four were autoclaved at 15 lbs. pressure for 20 minutes, and four were boiled for 5 minutes. Duplicate 100 ml. samples of each type of treatment were inoculated with enough *E. coli* suspension to give an initial count of about 1×10^7 cells per ml. These were designated as fresh samples, which indicates that the *E. coli* populations were added as soon as possible after delivery of the water sample to the laboratory. The duplicate uninoculated samples were stored in the dark at room temperature. Periodic plate counts on these uninoculated samples were made on a nutrient sea water agar * to observe the growth of the marine bacteria in the raw samples and to check on the sterility of the others. After 2 weeks' storage these samples were also inoculated with *E. coli* populations and are referred to as aged samples.

The standard *E. coli* suspension was made by growing a pure culture of *E. coli* on a distilled water agar in a 500 ml. bottle laid on its side (surface area about 120 sq. cm.). The agar was the same as the counting medium * except that distilled water was used instead of sea water. After growing for 18–24 hours, the cells were suspended in 9 ml. of tap water and aliquots were used for the inocula.

The inoculated samples of sea water were stored in the dark at room temperature, and lactose broth tubes were made in triplicate, in at least three dilutions, at various times to observe the changes in the coliform population. These tubes were incubated at 37° C. and read after 24 and 48 hours.

EXPERIMENTAL RESULTS

Two examples of the type of experiment performed to study the bactericidal activity of sea water are shown in Figure 1. During the lag period the coliform population remains relatively constant or may even increase slightly. Following this the population decreases in a logarithmic way. The coefficient of death rate (K) is the slope of the line relating the logarithm of the coliform population to time in days. It is obtained from the following equation:

$$\log C_t = \log C_l - K(t-l)$$

in which C_l and C_t are the numbers of coliforms at the end of the lag period (l) and at time (t) respectively. The time for 90 per cent mortality is equal to the sum of the lag period and the reciprocal of the coefficient of death

* 1.0 gm. peptone, 1.0 gm. glucose, 0.1 gm. KH_2PO_4, 0.01 gm. $FeSO_4$, 15 gm. Bacto-Agar in 1,000 ml. of sea water. Plates were counted after 7 days' growth.

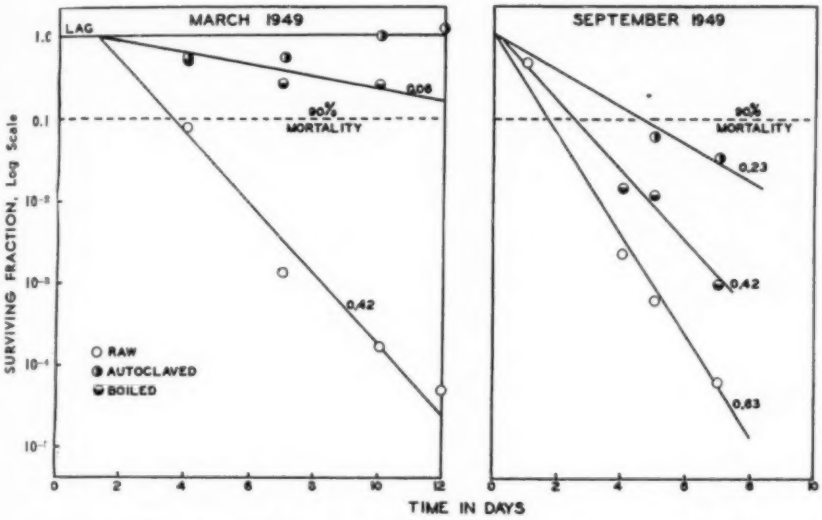

FIGURE 1—The changes in populations of *Escherichia coli* added to raw, autoclaved, and boiled sea waters

rate. In Figure 1 this time is indicated by the point where the population line crosses the dashed 90 per cent mortality line.

SEASONAL VARIATION

During a period of slightly more than one year, 37 experiments similar to those illustrated in Figure 1 have been performed. The results are shown in Table 1 and in Figure 2, where the temperature of the Woods Hole sea water is included for comparison.

The bactericidal properties of the raw fresh sea water demonstrated a decided seasonal variation, being relatively inactive during the winter and most active during the summer months. Correspondingly, the time required for the

TABLE 1

Summary of the Average Coefficients of Death Rate, Lag Periods, and Times for Mortality of 90 Per Cent of E. coli Populations in Fresh and Aged Sea Water at Various Times of Year

Treatment and Period *	No. of Expts.	FRESH SEA WATER			AGED SEA WATER		
		Coeff. of Death Rate days^{-1}	Lag Period days	90% Mortality days	Coeff. of Death Rate days^{-1}	Lag Period days	90% Mortality days
Raw							
Summer, 1948	9	0.96	0.9	1.9	1.63	0.0	0.6
Winter, 1948–1949	7	0.52	2.3	4.2	0.73	0.1	1.5
Spring, 1949	3	0.85	0.3	1.5	0.83	0.6	1.8
Summer, 1949	12	1.00	0.4	1.4	1.28	0.8	1.6
Boiled							
Summer, 1948	9	0.78	2.1	3.4	0.61	6.5	8.2
Winter, 1948–1949	6	0.18	8.8	14.4	0.17	12.2	18.1
Spring, 1949		....	....	....	....	....	....
Summer, 1949	11	0.29	5.5	9.0	0.29	4.0	7.4
Autoclaved							
Summer, 1948	9	0.64	1.4	3.0	0.61	3.6	5.2
Winter, 1948–1949	7	0.05	12.1	>20.0	0.07	5.7	19.9
Spring, 1949	3	0.0	20.0	>20.0	0.06	13.6	>20.0
Summer, 1949	12	0.30	6.8	10.1	0.26	4.5	8.4

* Summer, 1948, Aug. 10 to Oct. 8; Winter, 1948–1949, Oct. 22 to April 1; Spring, 1949, May 3 to June 16; Summer, 1949, June 22 to Oct. 20.

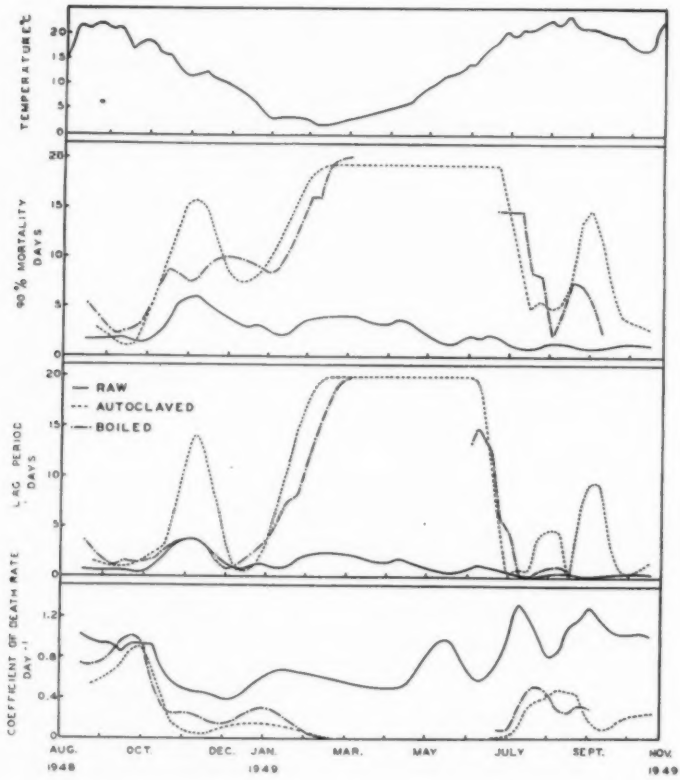

FIGURE 2—The bactericidal activity of fresh sea water at various times of year. The curves have been smoothed by using running averages of three values

disappearance of 90 per cent of the introduced *E. coli* populations was greatest (6.0 days) in early November, and least (0.6 days) in July.

Autoclaving the sea water destroyed a large part of its bactericidal activity. At no time was the residual activity as great as that of the raw sea water. During the winter, no appreciable mortality occurred in most samples even after 20 days. During the summer there was generally a residual activity in the autoclaved portions which sometimes reached 80 per cent of the raw water activity. The time for the death of 90 per cent of the *E. coli* populations in autoclaved water varied from 1.4 to more than 20 days.

Boiling raw sea water for 5 minutes resulted in an activity intermediate between that of the raw and autoclaved sea waters.

If a sample of raw sea water is stored in the laboratory, a tremendous increase of the normal bacterial flora occurs. This increase is, of course, associated with a decrease of available organic matter in the water, and with the accumulation of by-products of the metabolic activities of the marine flora. To determine the effects of these processes on the bactericidal activity, a

portion of each sample was aged for 2 weeks before inoculation with *E. coli*. Additional samples were autoclaved or boiled before storage, and these were used as controls.

Aging raw sea water in the laboratory for a period of 2 weeks previous to inoculation with *E. coli* generally resulted in an increased coefficient of death rate and a marked decrease or disappearance of the lag period. The seasonal variation persisted, however, and the time for the mortality of 90 per cent of the *E. coli* population in the aged raw water varied from 0.5 to 7.5 days. Aging of boiled and autoclaved waters had little or no effect on the activity. Figure 3 shows the variation throughout the year of the coefficients of death rate, lag and time necessary for 90 per cent mortality of *E. coli* populations in raw, autoclaved, and

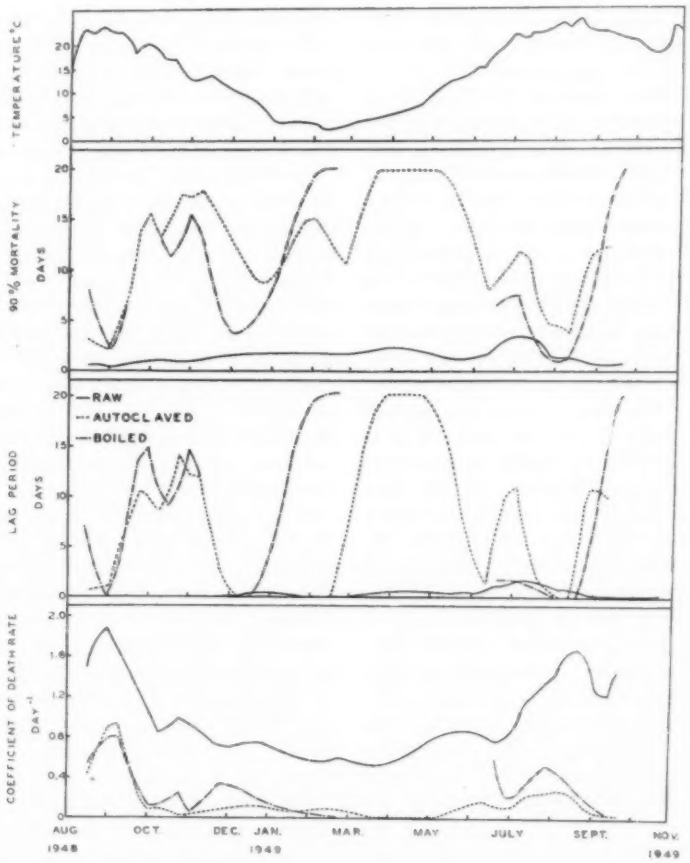

FIGURE 3—The bactericidal activity of aged sea water at various times of year. The curves have been smoothed by using running averages of three values

boiled sea waters after 2 weeks' aging in the laboratory. Table I summarizes the seasonal variations.

These data not only demonstrate the seasonal variation but also give some indications of the nature of the bactericidal activity of sea water. For example, they show that the salinity of sea water is not responsible for the bactericidal action, since the coliforms may survive for extended periods of time in the autoclaved water. The fact that the normal marine population increases in the raw water at the same time that the coliform population is dying off indicates that the bactericidal action is specific rather than general.

Comparison between the duration of the lag period in the raw water and the residual activity of the autoclaved and boiled water is informative. When the activity of the raw water is at its highest the lag period is generally brief. At the same times there is also a measurable activity in the autoclaved and boiled sea waters. This suggests that at these times the sea water contains a substance inimical to *E. coli* which is not completely destroyed by autoclaving or boiling. Conversely, when the bactericidal activity of the raw water is at a minimum, the lag period is generally of several days' duration. At the same time the boiled and autoclaved waters show very little or no activity for periods up to 20 days. This suggests that, at these times, the substance inimical to *E. coli* is either absent or is present at an ineffective level of concentration. The development of bactericidal activity in the raw water after a prolonged lag period suggests that the activity is associated with the growth of the natural marine bacterial population. The increase in activity of the aged, raw samples is also clearly dependent upon the growth of the normal marine bacterial flora, since no comparable increase in activity occurred in the boiled or autoclaved samples.

There are two possible explanations for increase of bactericidal activity following the growth of the marine flora. Neither can be eliminated on the basis of these experiments alone. It is possible that the increase of the marine bacteria resulted in an accumulation of organismal by-products inimical to *E. coli*. Equally plausible is the possibility that the decrease of available organic matter in the sea water makes it a less suitable medium for the survival of *E. coli*.

EFFECT OF ADDING ORGANIC MATTER

The possible importance of organic matter has also been suggested [12] as an explanation of the decrease in bactericidal activity of the autoclaved water. This decrease could result from the release or conversion of organic matter in the water to a more available form, thus making the sea water a more suitable medium for the survival of the coliforms. If this explanation is correct, addition of organic matter to sea water should produce activities similar to those found in autoclaved water. Since domestic sewage contains large amounts of organic matter, as well as coliform organisms, knowledge of its effects is necessary in order to interpret natural distributions.

We have added greater amounts of organic matter than are to be expected in natural sea water, but not enough to convert the water to a "culture medium." Keys and his coworkers show that the organic carbon content of sea water is variable and ranges from 1.2 to 2.0 mg./l.[13] In our experiments 50 mg./l. of peptone or 100 mg./l. of glucose were added to raw fresh sea water before inoculation with *E. coli*. The additions, therefore, increased the organic carbon content at least tenfold.

The effect of adding peptone to raw sea water was studied in seven experiments on water collected between May and July. A summary of these results

TABLE 2

Effect of the Addition of Peptone (50 mg./l.) on the Bactericidal Activity of Sea Water. Each entry in the Table is the Average of Seven Experiments

Treatment of water	*Lag Period days*	*Coeff. of Death Rate days^{-1}*	*Time for 90% Mortality days*
Raw	0.39	0.88	1.53
Peptone added	3.11	0.70	4.53
Autoclaved	14.5	0.12	22.9

is given in Table 2. The characteristics of the autoclaved and raw samples are included for comparison. In every case the addition of 50 mg./l. peptone increased the duration of the lag period. The effect on the coefficient of death rate was variable but more often than not it was comparable to that of the unenriched sea water. The average value of the coefficient in water containing added peptone was 80 per cent of that observed in the raw water. The autoclaved water had the longest lag period and the smallest coefficient of death rate of the three types of treatment. In the water enriched with peptone the average time required for the mortality of 90 per cent of the coliform population was about three times as long as in the raw water. Even so, it was only about one-fifth the time required for a comparable mortality in the autoclaved water.

Five experiments were conducted on raw sea water enriched with 100 mg. glucose per liter. The waters used in these experiments were collected during August, 1949. The results, with the corresponding raw and autoclaved sea waters are shown in Table 3. The addition of glucose shortened the lag period and decreased the coefficient of death rate. The time for the mortality of 90 per cent of the added coliforms was increased only slightly. The time required for 90 per cent mortality in the autoclaved waters was more than three times as long as the corresponding time required in the water enriched with glucose.

These experiments show that the addition of glucose or peptone to sea water does not decrease the bactericidal activity as much as autoclaving the water. It is concluded that the effect of autoclaving cannot be explained as a release of organic matter. It appears more likely that the destruction of the sea water population of bacteria is the important result of autoclaving. This belief is substantiated by a study of other methods of sterilization which are discussed below.

VARIOUS METHODS OF STERILIZATION

It has been shown that boiling and autoclaving both result in a decrease of the bactericidal activity of sea water. It appeared logical to attempt other methods of sterilization which would be less apt to modify the dissolved organic matter native to raw sea water and yet would remove the influence of the natural marine bacterial population.

TABLE 3

Effect of the Addition of Glucose (100 mg./l.) on the Bactericidal Activity of Sea Water. Each Entry in the Table is the Average of Five Experiments

Treatment of water	*Lag Period days*	*Coeff. of Death Rate days^{-1}*	*Time for 90% Mortality days*
Raw	0.8	1.16	1.66
Glucose added	0.52	0.72	1.92
Autoclaved	4.0	0.38	6.6

TABLE 4

Effect of Pasteurization and Chlorination of Sea Water on Its Bactericidal Activity

Treatments	No. of Expts.	Coef. of Death Rate days^{-1}	Lag Period days	90% Mortality days
Raw	8	0.95	0.4	1.5
Past. 30 min. @ 54° C.	8	0.31	5.9	9.1
Autoclaved	8	0.22	7.6	12.1
Raw	7	1.40	0.5	1.2
Past. 60 min. @ 54° C.	7	0.60	1.5	3.1
Autoclaved	7	0.32	6.8	9.9
Raw	2	0.84	0.35	1.5
Chlor. & Dechlor.	2	0.47	1.5	3.6
Autoclaved	2	0.47	0.7	2.8

Pasteurization and chlorination were selected for this study.

The pasteurization temperature was 54° C. In eight experiments this temperature was maintained for 30 minutes, in seven for 60 minutes. The chlorinated samples received 10 p.p.m. Cl_2, added as calcium hypochlorite. After 1 hour the samples were dechlorinated by adding thiosulfate. Complete removal of chlorine was checked by the orthotolidine method. The characteristics of these samples, together with the raw and autoclaved controls are presented in Table 4.

Both pasteurization and chlorination of sea water produce a lower bactericidal activity than is found in raw sea water. The coefficient of death rate in the pasteurized water was always higher than that in the autoclaved control, and was comparable to results obtained with boiled water. In the chlorinated sea water the coefficient was identical with that of the autoclaved sample, though the lag period was longer.

The data lead to the conclusion that any of the methods used to sterilize sea water decrease its bactericidal activity. The belief that the activity of sea water requires the presence of the natural marine bacterial flora is consequently strengthened. The fact that the autoclaved water is the least active of all may indicate that the bactericidal substance present in the water is somewhat heat labile.

DISCUSSION

These experiments show that the bactericidal activity of sea water requires the presence of the normal population of marine bacteria. Thus, any of the methods of sterilization we have tried decrease the activity, and only when the marine bacterial flora is present does the activity increase as a result of aging. Organic matter in the sea water decreases the activity somewhat but to a much smaller degree than does the absence of the marine population. The preponderance of evidence thus points toward an antibiotic action but it cannot be stated categorically that all other possibilities have been excluded. The character of the activity is such that it suggests that the bactericidal substance is present in very small concentrations.

The importance of these investigations is that they form a background of information concerning a process which contributes in an important way to the diminution of coliform bacteria in polluted tidal waters. The public health significance of this process in the purification of tidal waters in a particular situation will depend upon the length of time the polluted water remains within the estuary, in contact with beaches and shellfish areas. Unpublished

TABLE 5

Effect of Various Coefficients of Death Rate on an E. coli Population. The numbers in the Table are the numbers of coliforms persisting at the noted time for the K values shown at the top of the columns

Time days	$K = 0.5$	$K = 1.0$	$K = 1.5$
0	$1x10^6$	$1x10^6$	$1x10^6$
1	$7x10^5$	$1x10^6$	$7x10^4$
2	$1x10^5$	$1x10^4$	$1x10^3$
3	$7x10^4$	$1x10^3$	70
4	$1x10^4$	$1x10^2$	1
5	$7x10^3$	10	0.07
6	$1x10^3$	1	0.001

investigations made by this laboratory of the hydrography of Raritan and New York Lower Bays show that a period of 20 days is required, on the average, to flush the river water through the area. During such a period of time the mortality of the bacteria is very important in decreasing the bacterial pollution load. As an example of the importance of this process Table 5 cites a hypothetical situation in which a given population of coliform bacteria is exposed to waters of three different activities. The coefficients of death rate correspond approximately to the minimum, average, and maximum coefficients found in Vineyard Sound sea water at various times of the year. It is clear that the most active water will quickly become unobjectionable on the basis of coliform counts, while the least active water will remain objectionable for several days.

In any pollution survey which considers the distribution of coliform bacteria the bactericidal activity of the water must be taken into account if the distribution is to be explained and misleading interpretations are to be avoided.

SUMMARY

1. *Escherichia coli* populations are unable to survive when placed in raw sea water. This bactericidal action of sea water may contribute in an important way to the disappearance of coliform bacteria in tidal waters.

2. There is a marked seasonal variation in the length of time *E. coli* can survive in sea water. They are less viable in the summer months than in the winter.

3. Aging of raw sea water results in an increase in the bactericidal activity of the water. Aging of boiled and autoclaved waters produces little or no change in their bactericidal properties.

4. Sea water sterilized by boiling, autoclaving, pasteurizing, and chlorinating has less bactericidal activity than raw sea water.

5. The addition of organic matter decreases the bactericidal activity of sea water, but has less effect than various methods of sterilization.

6. It is concluded that the most probable cause of the death of *E. coli* populations in sea water is an antibiotic action which requires the presence of the normal marine flora.

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American Board of Preventive Medicine and Public Health, Inc.

The next examination to be given under the auspices of the American Board of Preventive Medicine and Public Health, Inc., has been announced for St. Louis, Mo., immediately preceding the 78th Annual Meeting of the American Public Health Association on October 28 and 29, 1950. Applications under the rules of the Board close sixty days before the date of the examination.

Ernest L. Stebbins, M.D., Secretary of the Board, 615 North Wolfe Street, Baltimore 10, Md., has announced that the Board has considered 1,355 applications since its establishment in 1949 and that at the present time 859 physicians have been certified as specialists in the field of preventive medicine and public health. This Board is a member of the Advisory Council on Medical Specialties, including all the other specialty boards recognized by the American Medical Association.

Dr. Stebbins also announced that the Board at its meeting in Washington on August 11 voted to change the fees applicable to this examination so that for applications received on or after January 1, 1951, the total fee for application and examination will be $90. Any repeat examinations which an individual may take will be at the rate of $15 for the first and the second and final repeat examination $25.

Relation of Peptones and Other Culture Media Ingredients to the Accuracy of Fermentation Tests

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PEPTONES, alone or in combination with other materials, are popular as basic ingredients for culture media. They have been used rather indiscriminately, with little attention either to selection or evaluation for different purposes in the bacteriological laboratory. A notable exception is the study by Stokes, Gunness, and Foster,[1] of the vitamin content of 17 peptones and other culture media ingredients. For general use, high growth-promotion value, including vitamin content, and low toxicity are important attributes of the components of culture media. For use in biochemical tests for identification of microörganisms, the presence or absence of the specific substances with which the particular tests are concerned, is also of primary significance.

It is the purpose of this paper to present the findings of a study of peptones and other materials for their suitability, in respect to fermentable carbohydrate content, for use in media for performance of fermentation tests. Further, it will be shown that a simple evaluation procedure is sufficient for determining suitability of materials for incorporation into fermentation test media. Most of the peptones, and all of the meat extracts examined have been found unsuitable for fermentation studies, in that they already contain appreciable amounts of fermentable substances which give rise to inaccurate results. Two types of peptones have been found which may be used with a high degree of accuracy in media for fermentation tests.

EXAMINATION OF PEPTONES

More than 450 samples of peptones and 60 samples of other culture media ingredients have been studied in regard to their behavior in fermentation test media. The peptones were representative of those which are in current use in bacteriological laboratories, or which have been available in the near past. All of them were designated for bacteriological use. These peptones were classified on the basis of the material from which they were derived and the method of preparation. The peptones were of 84 types, according to available information, or, lacking that, according to trade names or the names of the companies marketing the materials. For examples, papaic digest of soya meal was regarded as one type of peptone, and papaic digest of cottonseed meal as another type, while Bacto, Fairchild and Witte peptones were arbitrarily regarded as being three different kinds of peptones.

The protein hydrolyzed and method of hydrolysis were stated for 33 of the 84 types; the source was clearly designated and the method of preparation was either not stated, or was indicated only in a general manner (e.g., "enzy-

mic" treatment), in 27 cases; and no information was given concerning 24 types of peptones. The protein sources from which the peptones were derived included blood, casein, cottonseed meal, egg, gelatin, lactalbumin, meat, milk, heart muscle, soya meal, soya protein, and yeast. Hydrolysis had been performed by means of pancreatin, papain, pepsin, trypsin, and autolytic enzymes, or by means of acid or alkali. The number of types and samples of peptones examined is summarized in Table 1.

TABLE 1

Peptones Examined

		Types	*Samples*
Sources	stated	60	382
	not stated	24	69
Hydrolysis	stated	33	334
	not stated	35	84
not stated specifically		16	33
Totals		84	451

The peptones were tested for the presence of fermentable carbohydrate in the manner specified by the *United States Pharmacopoeia XIII*,[2] for the examination of pancreatic digest of casein. The peptones or other materials to be examined were prepared in 2 per cent concentration with added sodium chloride and phenol red, and were used at a pH of 7.3. No carbohydrates were added. The *Pharmacopoeia* description specifies the use of a culture of *Escherichia coli;* these tests were performed with at least two *Aerobacter,* five *Escherichia,* and seven *Salmonella* cultures, and *Streptococcus liquefaciens.* The formation of acid, or of acid and gas, within 48 hours was regarded as positive evidence of the presence of fermentable substances in the material under investigation. Some representative results are given in Table 2.

Inspection of the table shows that most of the peptones appeared to have a high carbohydrate content, as would be expected from the nature of the original source materials, since both plant and animal tissues contain carbohydrate. Conjugated proteins may contain corbohydrate. Lactalbumin, for example, is thought to contain at least two carbohydrates and, consequently, lactalbumin peptone should and does

TABLE 2

Examination of Peptones for the Presence of Fermentable Carbohydrate

			Percentage of Cultures Forming Acid or Acid and Gas in 48 hours				
Derivation	*Hydrolysis*	*No. Tested*	*Aerobacter*	*Escherichia*	*Salmonella*	*Streptococcus*	*Total Positive*
Blood	Papaic	1	0%	20%	0%	0%	7%
Blood	Tryptic	1	0	60	14	×*	29
Casein	Acid	6	100	93	74	×	85
Casein	Alkaline	2	0	0	0	×	0
Casein	"Enzymatic"	30	72	85	25	0	49
Casein "Vitamin-free"	"Enzymatic"	1	100	100	71	×	86
Casein	*Pancreatic*	*50*	*0*	*8*	*1*	*0*	*4*
Cottonseed	Papaic	1	100	80	57	0	67
Egg	Papaic	1	100	100	100	100	100
Gelatin	*Pancreatic*	*30*	*0*	*0*	*0*	*0*	*0*
Lactalbumin	Pancreatic	5	100	100	100	80	99
Lactalbumin	"Enzymatic"	2	100	100	100	100	100
Meat "U.S.P."	?	3	67	80	28	0	49
Meat	Pancreatic	6	100	80	45	0	61
Meat	Peptic	20	100	96	84	0	88
Milk	?	1	100	100	100	100	100
Milk	Tryptic	1	100	100	57	0	73
Soya Meal	Papaic	40	100	100	90	100	96
Soya Protein	?	1	100	100	100	100	100
Yeast	Autolytic	50	100	100	100	70	98

* × = No Growth.

have a considerable carbohydrate content. As a result, nearly all of the test cultures show definite acid production, and aerogenic strains produce gas within 24 hours, when tested on lactalbumin peptone.

Pancreatic hydrolysates of casein and gelatin are quite different from most of the peptones studied, when prepared from adequately purified protein, so that no extraneous carbohydrate is introduced. For comparison, attention is particularly called to the high percentage of positive results obtained with the digests of milk, from which no attempt had been made to remove either the lactose or lactalbumin. Such reactions as do occur in the pancreatic casein peptone cultures (4 per cent total positive cultures) are usually feeble—often equivocal—and do not occur within 24 hours. The gelatin peptones appear to be remarkably free from fermentable components, and highly satisfactory for use in media for fermentation reactions.

Other peptones included in the series, but not listed in Table 2, consisted of blended peptones; peptones derived from mixtures of source materials; or varieties of meat and other peptones listed; and were all characterized by a high carbohydrate content.

Results with peptones of unstated derivation or preparation or both are not recorded here, for they were more numerous than informative. In general, when a number of replicates were available for study, high or variable carbohydrate content was characteristic. Of the 51 such types examined, the "best" one, presently available and capable of growing the test cultures, gave 30 per cent positive cultures in 210 tests. Of those formerly in use, the Witte peptone gave the least evidence of containing carbohydrate; only 5 per cent positive results were obtained, but the samples tested were unable to support growth of the streptococcus.

MEAT EXTRACT

The most popular basic medium in use at the present time for fermentation tests is extract or "nutrient" broth. It is recommended for routine use in identification of organisms, such as those found in water, milk, and other materials of public health importance, by many standard reference books, includ-

TABLE 3

Examination of Meat Extracts and Infusions and Extract Broths

		Percentage of Cultures Forming Acid or Acid and Gas in 48 hours				
	No. Tested	*Aerobacter*	*Escherichia*	*Salmonella*	*Streptococcus*	*Total Positive*
Meat Extracts	11	100%	100%	96%	72%	96%
Meat Infusions	12	92	87	62	25	71
Extract Broths	18	92	93	85	11	84

TABLE 4

Effect of Addition of Meat Extract and Dextrose to Carbohydrate-free Casein Peptone

		Percentage of Cultures Forming Acid or Acid and Gas in 48 hours				
Added Ingredient		*Aerobacter*	*Escherichia*	*Salmonella*	*Streptococcus*	*Total Positive*
None		0%	0%	0%	0%	0%
Meat Extract	0.1%	30	20	43	0	30
Dextrose	0.001%	0	0	0	0	0
Dextrose	0.005%	52	20	0	0	13
Dextrose	0.01%	100	100	43	0	69
Dextrose	0.05%	100	100	100	100	100

ing those of the American Public Health Association[3, 4, 5] and also the Society of American Bacteriologists.[6] Usually the formula includes meat extract as well as peptone. Tables 3 and 4 summarize results obtained from studies of meat extracts and meat infusions.

It is immediately evident from Table 3 that for practical purposes meat extract contains at least as much fermentable material as meat infusion, giving 96 as compared with 71 per cent positive results. Ordinary extract broths, containing non-carbohydrate-free peptone with meat extract, gave 84 per cent positive results when tested in the same way.

Table 4 shows that addition of even 0.1 per cent meat extract to a carbohydrate-free casein peptone gave rise to 30 per cent positive cultures. By comparison, dextrose added to the same peptone could not be detected when added in a concentration of 0.001 per cent, but was detectable when added in 0.005 per cent concentration.

INFLUENCE OF pH AND INDICATOR

Meat extracts appeared to be an important possible source of error in fermentation tests, but difficulties with fermentation tests, although by no means uncommon, are not actually encountered with the frequency which Table 3 would suggest. Because of this discrepancy, an extensive series of experiments was carried out. Media were prepared at a pH of 7.3 with phenol red as the indicator, and at a pH of 6.8 with brom-cresol-purple as the indicator; they were made up with and without added carbohydrates. Forty-three test cultures were employed, including strains of coliform and paracolon bacilli, *Proteus, Salmonella, Shigella, Pasteurella multocida, Corynebacterium, Neisseria sicca, Candida albicans,* and several species of Gram-positive cocci. The cultures were

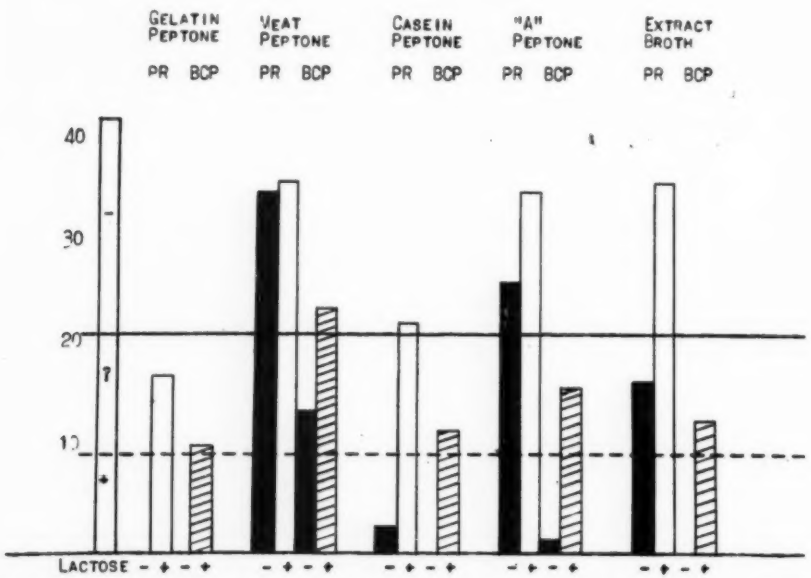

FIGURE 1—Fermentation Reactions of 43 Cultures in Five Substrates with (+) and without (—) added Lactose, and with Phenol Red (PR) and Brom Cresol Purple (BCP) as pH Indicators. Solid Bars Indicate False-Positive Reactions.

selected so that about one-third of them would be expected to ferment lactose rapidly, one-third of them would not be expected to ferment lactose, and the rest were organisms thought to be slow lactose-fermenting, or whose reactions were not known. The results of all the experiments were similar, and Figure 1 gives the results of a lactose experiment. The chart records the evidence of fermentation obtained with five kinds of media, in the presence and absence of lactose, after incubation for 72 hours.

The pancreatic gelatin peptone gave no false-positive results in media without added lactose, and there were fewer lactose-positive reactions visible in brom-cresol-purple media than in media with phenol red. The peptic meat peptone gave almost the same number of positive reactions whether lactose had been added or not, as indicated by the phenol red. With brom-cresol-purple as the indicator, many of the false-positives were obscured, but over half of the cultures which seemed to ferment lactose caused an equal amount of change in tubes without lactose.

The pancreatic casein peptone showed no positive reactions in the absence of added lactose in 24 hours, but after 48 hours of incubation, three phenol red cultures were weakly positive. There is again a discrepancy between the number of positive lactose reactions with phenol red and brom-cresol-purple, those with phenol red being more numerous. The slightly greater number of positives observed with the casein as compared with the gelatin peptone cultures is probably attributable to the heavier growth of some strains, particularly pneumococci.

The "A" peptone (a peptone of unstated derivation) and the extract broth both gave many false-positive fermentation reactions when phenol red was used as the indicator. These reactions were masked when brom-cresol-purple was employed. Therefore, when these substrates are used with brom-cresol-purple in fermentation tests, results are fairly satisfactory, although their use undoubtedly implies the possibility of false-positive results. In addition, they are likely to give false-negative results because fewer lactose-positives are obtained after any given incubation period —after 7 days' incubation there were still fewer positive tests in the brom-cresol-purple "A" and extract broth media, than there were in 3 days in gelatin and casein peptone phenol red lactose media.

DISCUSSION

At the present time, fermentation tests performed for the identification of microorganisms are not altogether satisfactory. References to late and variable reactions are common. Results cannot regularly be duplicated in different laboratories, and sometimes not even in the same laboratory. Many of these reported difficulties and discrepancies are readily explicable on the basis of the results reported here. Investigation of a large number of samples of the many kinds of peptones, which are, or have been, available for bacteriological work, shows clearly that there is ample carbohydrate intrinsic in most of them to give rise to variable and false-positive results.

The importance of carbohydrate in meat infusions has long been recognized, and formerly fermentation media were made from infusions in which coliform organisms had previously been grown to destroy the carbohydrate.[7] However, meat extracts, which are not essentially different from meat infusion, continue to be used widely, and no attempt is made to free the extracts from sugar.

The use of a lower pH and brom-cresol-purple does obscure most of the false-positives obtained with phenol red media prepared with carbohydrate-containing peptones and meat extract. This method has the disadvantages of obscuring some positive reactions in the presence of added carbohydrate, and delaying the appearance of others.

Yeast derivatives and sera are sometimes used in fermentation media as supplements to obtain growth. The errors which may occur from incorporation of sera in media were pointed out by Peizer.[8] In this laboratory, difficulty with fermentation tests was encountered in studies with lactobacilli; false-positives occurred in media containing some yeast autolysate and no added carbohydrate. Inaccuracies of this sort are not surprising, in view of the fact that yeast derivatives may contain as much as 40 per cent carbohydrate. All of the plant peptones so far studied have had a high carbohydrate content, as shown in Table 2, and are *ipso facto* unsuitable for incorporation into media for fermentation tests.

Unless media for fermentation tests are synthetic, they should be prepared only with ingredients known to be free or tested for freedom from fermentable components. Two peptones, pancreatic hydrolysates of casein and gelatin, have been found to be relatively free from fermentable components, and suitable for use in fermentation media. If growth of a given organism does not occur in such media, with added carbohydrate, an effort should be made to supplement by means of specific growth factors, rather than with carbohydrate-containing materials, in order to maintain a high degree of accuracy.

CONCLUSIONS

1. Bacteriological peptones vary in their derivation and preparation, and therefore in their composition. In selection of peptones and other ingredients of culture media used for fermentation studies, the presence or absence of intrinsic fermentable components should be considered.

2. Sufficient fermentable material is present in most bacteriological peptones, including yeast autolysates, and in meat extracts, so that it is readily demonstrable by a simple testing procedure. These fermentable components may give rise to false-positive results and constitute an important cause of inaccuracy.

3. Routine fermentation tests for identification of microörganisms may be performed with accuracy, when materials tested for freedom from fermentable components are used as basic substrates. Two peptones which may be so used are pancreatic digests of casein and gelatin.

4. The fermentation test is highly sensitive when an indicator having a color change at pH 6.8 to 7.0 is used. This pH is within the physiologic growth range of most organisms, and reactions occur more frequently and more promptly than when an indicator having a lower pH range is employed.

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Comparative Studies of Group "B" Streptococci of Human and Bovine Origin*

I. Cultural and Biochemical Characters

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AYERS in 1916 could differentiate certain hemolytic streptococci of bovine origin from human streptococci by the final hydrogen ion concentration produced when they were grown in peptone broth to which was added glucose or one of several other sugars. He found that the human pathogenic strains generally produced a lower acidity than did the strains from milk and the udder of the cow. Avery and Cullens in 1919, and Brown in 1920 reported similar results. Ayers and Rupp in 1922 made use of the ability to hydrolyze sodium hippurate to separate hemolytic bovine streptococci from those of human origin. They found that all their 44 strains from the udder of the cow hydrolyzed sodium hippurate, while all the 33 human strains examined failed to do so. Avery, in 1929, demonstrated that a certain group of bovine streptococci were tolerant to a concentration of methylene blue in milk which inhibited those of human origin. He used this test combined with the final acidity produced to differentiate between them.

Brown, in 1919, mentioned a different appearance exhibited in blood agar from the usual beta appearance by certain bovine strains giving the same fermentation reactions as those of human origin. In the hemolysis produced by these strains, there was a central zone of complete hemolysis and a peripheral zone of partial hemolysis separated by an intermediate dark zone. There was no discoloration. This phenomenon has been observed by other authors. In 1934 Brown reported a brief description of the phenomenon and called it "double zone beta hemolysis." In 1937 he published a detailed study of it, and showed that it was influenced by various factors such as the number of colonies in the plate, the period of incubation, the kind of blood and other constituents of the medium, the pH of the medium, and the exposure to a lower temperature.

Originally streptococci producing this appearance in blood agar were obtained from milk and from mastitis in cows. But later they have been found in human beings, usually as nonpathogenic saprophytes in the throat, vagina, and urine, and they were isolated from postmortem cases from the heart blood, lungs, peritoneal fluid, and other places.

That the double-zone beta-hemolytic streptococci showing the same cultural and biochemical reactions were found in both cows and man, suggested an epidemiological importance. Although they are usually saprophytes in man, they constitute the commonest cause of bovine mastitis. So, whether the strains

* From a dissertation submitted to the Faculty of Philosophy of the Johns Hopkins University in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

found in cows and those of human origin are identical or different is an important question which has to be settled. Several groups of workers undertook to throw some light on this problem in America, England, and Australia, and some conflicting results were reported.

Plummer in 1934 suggested that the strains isolated from human beings and resembling the bovine strains in fermentative reactions, had been transferred through contact with cows or raw milk and were actually bovine. The same suggestion was offered for the strains isolated from cows and resembling human strains in reactions. Hare and Colebrook in 1934 concluded on the basis of biochemical reaction that the saprophytic strains found in man were apparently of the same "type" as those which caused bovine mastitis. Brown in 1939 studied his "double-zone beta-hemolytic" streptococci and found that all belonged to the serological group B, and that there were 3 "fermentative groups" among these strains isolated from human and animal sources. These were based on the fermentation of lactose and salicin. He recognized "lactose +, salicin —," "lactose +, salicin +" and "lactose —, salicin +" groups. The lactose-negative strains were not found in bovine sources. But Little in 1938 produced mastitis experimentally by inoculating these strains into the udder. Salicin-negative strains were not reported from pathological conditions in man.

Among the group of strains which were recognized serologically as group B of Lancefield, the animal ones include both alpha- and beta-hemolytic strains. Alpha strains have not been isolated from human sources.

While the present work was being done, a report came out by Pomales-Lebron and associates in 1947 on the biological properties of *Streptococcus agalactise* and group B streptococci of human origin. They concluded, on the basis of their findings, that in spite of minor differences between cultures of bovine and human origin, their similarity in other respects pointed to a close relationship between these organisms.

MATERIAL

A total of 69 group B strains of human and bovine origin were used in this study. Most of the strains are from Dr. Brown's collection including the 5 human type strains isolated by Simmons and Keogh in 1940. Eleven of the bovine type strains were kindly sent to us by Dr. Plastridge. Ten strains were recently isolated from milk and kindly supplied by Dr. Heishman from Beltsville Research Center, Pathological Division, Beltsville, Md. Some fresh strains were isolated from human sources in this department.

The culture media used are listed below:

1. Pancreatic digest broth (Brown 1948).
2. Fermented infusion broth (prepared from meat infusion which was fermented by yeast) plus carbohydrates for fermentation tests. The carbohydrates used were: lactose, sucrose, salicin, mannitol, sorbitol, trehalose, inulin, raffinose, and glycerol.
3. Sodium hippurate broth (Ayers and Rupp 1922).
4. Aesculin broth (Storrs Agricultural Experimental Station, *Bull. 240*).
5. Broth for preparing agglutination antigen (Plastridge, *et al.*, 1940).
6. Trypticase soy broth (Baltimore Biological Laboratories).
7. Methylene blue in milk (as in 4 above).
8. One per cent dextrose in infusion broth.
9. Pancreatic digest blood agar (Brown, 1919, 1948).

PROCEDURES

All the strains were grown in deep blood-agar pour plates using defibrinated rabbit's blood; to determine their effect on the red blood corpuscles (Brown, 1919). They were tested for the fermentation of the carbohydrates mentioned, which was determined by bromo-cresol-purple indicator incorporated in the medium. The tests were

carried out for 7 days before being discarded as negative, and in the case of glycerol, for 14 days. The splitting of aesculin was looked for by adding a drop a 1 per cent aqueous solution of ferric citrate to the 48 hour incubated culture. In positive cases, the original bluish fluorescence disappears and a dark brown color develops. The sodium hippurate hydrolysis was tested for by the ferric chloride reagent. In positive cases a brown precipitate permanently appears (Ayers and Rupp, 1922). The tests for the action on the milk plus methylene blue were performed by inoculating the 5ml. tubes with 2 drops of a 24 hour broth culture of the strain. Reduction of the methylene blue may occur at different depths of the milk column, with or without clotting. The incubation was carried out for 14 days. The final pH was determined after 5 days' incubation in 1 per cent dextrose infusion broth. In most cases, Brown's cup method was used (Brown, 1924). Later in the work, a comparator devised by H. O. Schulze in this department using the Gillespie principle for rapid and simplified micro-determination of pH, was used in addition (*Science* 111:36, 1950).

RESULTS AND DISCUSSION

All the strains of human and bovine origin fermented dextrose, sucrose, and trehalose, usually in 24 hours. All of them hydrolyzed sodium hippurate and failed to split aesculin. All, except 3 strains, gave a final pH between 4.4 and 4.6. The 3 exceptions were, one human strain giving a pH of 4.8 and 2 bovine strains giving a pH of 4.7. As is shown in Table 1, 77.4 per cent of the human strains fermented glycerol, while only 34.2 per cent of the bovine strains did so. Simmons and Keogh in 1940 found all of their human strains to ferment glycerol, but they did not report on glycerol fermentation by bovine strains. Pomales-Lebron, *et al.* found that 60 per cent of their human strains were positive for glycerol fermentation, 30 per cent gave doubtful results and 10 per cent were negative. The corresponding percentages for the bovine strains were 18, 30, and 52.

As regards the action on lactose and salicin, the 3 groups suggested by Brown in 1939 are shown in Table 1. No human strain was found which could ferment lactose but not salicin. Also no bovine strain was found which could ferment salicin but not lactose. Both bovine and human strains were represented in the "lactose +, salicin +" group by 68.4 per cent and 35.5 per cent respectively.

Two strains (namely Bennett and

TABLE 1

Character	*lac+, sal+*		*lac+, sal−*		*lac−, sal+*		*glycerol*		*Total*	
	hum.	*bov.*	*hum.*	*bov.*	*hum.*	*bov.*	*hum.*	*bov.*	*hum.*	*bov.*
Number	11	26	0	12	18*	0	24	13	31	38
Per cent	35.5	68.4	0	31.5	58.0	0	77.4	34.2		

* Two strains, Bennett and Cashmeyer, were originally as studied by Brown in the group "lactose−, salicin+", but in this study they have lost the power to ferment salicin, apparently permanently.

TABLE 2

Methylene blue in milk		*1/20000*		*1/15000*		*1/10000*		*1/7500*		*1/5000*		*Total*	
		hum.	*bov.*	*hum.*	*bov.*	*hum.*	*bov.*	*hum.*	*bov.*	*hum.*	*bov.*	*hum.*	*bov.*
Number	Reduct.	28	22	28	18	24	14	23	9	17	4	31	38
	Clotting	10	20	9	16	9	13	8	8	4	4	31	38
Per cent	Reduct.	90.3	57.9	90.3	47.3	77.4	36.8	74.2	23.6	54.9	10.5		
	Clotting	32.2	52.6	29.0	42.1	29.0	34.2	25.8	21.0	12.9	10 5		

Cashmeyer) were originally, as studied by Brown in 1939, in the group of "lactose −, salicin +", but in this study they had lost the power to ferment salicin, apparently permanently. Such strains as "lactose −, salicin −" were not found in nature from either human or bovine sources. Incidentally this change in the biochemical character did not cause failure to type one of the two strains serologically into one of the available types, but the other strain could not be typed. It cannot be said whether this failure to be typed was due to the biochemical change or due to its belonging to another yet unrecognized type.

It was also shown (Table 2) that a larger percentage of the human strains than of the bovine strains could reduce methylene blue in milk under the conditions of the experiments described. The difference between the reducing power and the clotting power of milk was not significantly large in the bovine strains while it was marked in the human strains. This can be explained by the absence of bovine strains failing to ferment lactose while many of the human strains were lactose-negative (56.0 per cent). The clotting is an acid one due to the acid production from the fermentation of lactose in the milk. Obviously the ability to reduce methylene blue is not associated with lactose fermentation or with lactose as a growth promoting factor.

Certainly there are biological differences apparent between the human strains and the bovine strains, if they are taken as two collective groups. Some characters can, at least up to the present, definitely decide whether a strain is to be considered human or bovine. For example, a "lactose −, salicin +" strain is in all probability of human origin since it has not been found in nature from bovine sources. Also with a strain which is "lactose +, salicin −," we can say with a fair amount of certainty that it is of bovine origin on the same grounds.

Alpha-hemolytic streptococci of group B (Lancefield), which are present in bovine mastitis cases are not reported from human sources. In this study a deliberate search to find such strains from human sources was made. Alpha-hemolytic streptococci were supplied by the biological laboratory of Johns Hopkins Hospital on blood agar plates. Sixty-two strains were collected from urine, throat, nose, and autopsy material. The procedure was to inoculate a trypticase soy broth tube from a single well defined alpha-hemolytic colony from the blood agar plates supplied. The next day a smear was examined and a tube of sodium hippurate broth inoculated. The purpose was to find a sodium hippurate-positive strain and then its full study would be carried out. Of the sixty-two strains isolated, only one was found to be hippurate-positive using the ferric chloride reagent. On further study, this strain was found not to belong to group B by the precipitation method. Thus it can be concluded that attempts to isolate a group B alpha-hemolytic streptococcus from human sources were not successful.

On the other hand, in a certain group of strains, namely Brown's "lactose +, salicin +" group, which can be isolated from both human and bovine sources, no cultural or biochemical method is yet available to decide definitely or even presumptively, whether they are identical or different. The action on methylene blue in milk and on glycerol may help in a collective way but not with any amount of certainty; and for a single strain there is no possible way to reach a decision.

There is no doubt that the cultural and biochemical methods of study are extremely useful subsidiary means of differentiating between species or varieties of streptococci. But it seems that under special circumstances they are not

enough and other methods have to be employed to differentiate between closely related strains. This is especially so when the differentiation is of practical importance as in this case of strains from both human and bovine sources which are alike in every cultural and biochemical respect. So in spite of all the disadvantages cited against the serological methods of differentiation such as impracticability, difficulties, and expense, they have to be used when the biochemical methods do not serve to settle a disputed differential point.

It will be noticed that no specific names were mentioned in this discussion. Now it may be of interest to present the situation of the nomenclature of this group of organisms. For many years, the names *Streptococcus mastitidis* and *Streptococcus agalactiae* have been used interchangeably for common bovine mastitis streptococci, both hemolytic and nonhemolytic, and now recognized as members of serological group B. Frost, Gumm, and Thomas in 1927, proposed the name *Streptococcus asalignus* for the salicin-negative hemolytic streptococci found in milk. Frost and Engelbrecht in 1940 proposed that the name *Streptococcus mastitidis* be reserved for the beta-hemolytic mastitis streptococcus of group B, and the name *Streptococcus agalactiae* for the nonhemolytic (alpha) mastitis streptococcus of group B, both of which ferment lactose and salicin. However, of recent years, veterinarians have shown little interest in recognizing these differences, since the clinical picture is constant, and they have persisted in regarding these streptococci as of one species, *Streptococcus agalactiae*. Unquestionably they show great cultural and biochemical similarity, except for salicin fermentation and appearance of the colonies in blood agar. In an effort to reach a satisfactory compromise, Brown, at the Fourth International Congress for Microbiology in 1947, proposed that these three kinds of mastitis streptococci of serological group B be recognized as varieties of *Streptococcus agalactiae*, namely, *var. agalactiae* (gamma to alpha appearance in blood agar and salicin-positive), *mastitidis* (beta zones, salicin-positive) and *asalignus* (beta zones, salicin-negative). All ferment lactose.

Brown in 1939 at the Third International Congress for Microbiology proposed the name *Streptococcus opportunus* for the lactose-negative, beta-hemolytic streptococcus of group B described by him, in 1939, as commonly isolated from human sources but not from naturally occurring bovine mastitis. This leaves the lactose-positive, salicin-positive beta-hemolytic streptococcus of group B from human sources without taxonomic differentiation from similar streptococci of bovine origin.

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Comparative Studies of Group "B" Streptococci of Human and Bovine Origin*

II. Serological Characters

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STABLEFORTH in 1932 examined the serological characteristics of one group of streptococci causing bovine mastitis, "the so-called *Streptococcus mastitidis* or *Streptococcus agalactiae*," viz., his group I, which was found to be Lancefield's group B. At first he used Lancefield's precipitation method, but later he carried out his typing by the rapid macroscopic slide agglutination technic at room temperature and by agglutinin-absorption tests. He found the results obtained by the two methods to be in close agreement. Three distinct types were recognized in this group and he designated them a, b, and c. Both hemolytic and non-hemolytic strains were encountered in types a and b, and were indistinguishable serologically. Type c included only hemolytic strains. In his hands, types were alike biochemically except for the hemolytic properties mentioned, and strains "of different biochemical groups were never alike serologically." The double ring phenomenon was observed in all the hemolytic strains of his type Ib.

Lancefield in 1934, using her precipitation method and passive protection tests in mice, distinguished 3 types of hemolytic group B streptococci, mostly isolated from cattle. She designated them I, II, and III, and she identified the type-specific substance as a polysaccharide and called it "S substance." She considered the agglutination method unsuitable due to much cross-agglutination and other difficulties. In 1938, using the same two methods, she recognized two distinct types in her type I and called them Ia and Ib.

Stableforth in 1936 recognized two more types and he called them a2 and c2. This different designation led to much confusion and a system was suggested at the International Congress for Microbiology in 1936 to adopt the Arabic numerals for the serological types in order to avoid the possibility of confusion with Lancefield's well accepted group classification of hemolytic streptococci, the groups being indicated by letters A, B, C, etc. There followed many investigations by workers in various parts of the world, as a result of which many types and subtypes were recognized. Thus far, 16 types and subtypes have been recorded from bovine sources, and there is good reason to believe that others exist.

Simmons and Keogh in 1940 recognized 5 types in strains of group B isolated from human sources. They used

* From a dissertation submitted to the Faculty of Philosophy of the Johns Hopkins University in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

mainly the slide agglutination method and sometimes precipitation tests were carried out for confirmation. They found that sera against these 5 types did not agglutinate any of the bovine type strains. Conversely, none of the human type strains was agglutinated by any of the sera against the bovine types.

This is not in agreement with the results obtained in North America, where it has been reported that similar serological types may be found in bovine mastitis and from human material. Lancefield and Hare in 1935 reported that 33 of 34 strains of human origin examined fell into one or other of the specific types originally differentiated among strains of bovine origin. Plummer in 1941 reported that 92.6 per cent of 189 strains of human and bovine origin were placed in one or other of the 4 Lancefield types. Both used the precipitation tests. According to these results, it would be possible for bovine infections to arise from human sources and vice versa. From the public health standpoint, this is not of much importance because serious human infections are rarely caused by streptococci other than those of group A. But from the standpoint of bovine mastitis and its great economic importance, it is of considerable interest to settle this problem so as to decide whether man is to be considered as a source of infection of the cow's udder and is to be included in the control campaign.

The conflict between the conclusions of the American workers and those of the Australians seems to be complete. More work was felt to be urgently needed.

MATERIAL

This has already been given in part I of this work.

PROCEDURE

1. *Agglutination Methods*

The animal used to produce sera with agglutinins was the rabbit. First, about 10 ml. of blood were drawn from an ear vein to obtain a control serum, which was tested to guard against nonspecific agglutination, before any treatment of the animal.

The strains employed for injection were the type strains supplied from bovine and human sources. The first were kindly sent to us by Dr. Plastridge as cultures in fluid media in sealed tubes; the latter were sent to Dr. Brown by Dr. Keogh in 1941 and were kept in a dried state until this work was begun late in 1946. After assured purification, the strains were kept on pancreatic digest slants with two drops of blood added, transfer being done about every 6 weeks.

The material for injection was a 20 hour living culture in pancreatic digest broth, centrifuged and suspended in 0.85 per cent NaCl solution equal in amount to that of the broth. The injections were given intravenously at weekly intervals, the first dose being 0.25 ml., the second 0.5 ml., and the third 1.0 ml. One week after the last injection, 10 ml. of blood were drawn from the ear vein to test the serum for its potency. If it was found satisfactory, the animal was bled from the heart the next day, and the required amount of test serum was thus procured. If the serum was found not satisfactory, one or more additional injections of 1.0 ml. might be given. The serum was considered satisfactory when it caused definite agglutination of the homologous suspension within 10 seconds from beginning to rock the glass piece (the method to be described shortly) when used in a dilution of 1/10 or higher, when it gave a positive result with the same suspension within 60 seconds in a dilution of 1/320–1/640, and when it showed not much cross-reaction with the other type strain suspensions.

The sera were preserved by adding merthiolate 1/1000 aqueous solution so

that the final dilution in the serum was 1/50000, and they were kept in the refrigerator.

For the preparation of satisfactory suspensions for the agglutination tests trypticase soy broth (Baltimore Biological Laboratory) was used as well as Plastridge medium (Plastridge, *et al.* 1940) with or without the addition of 1 per cent inactivated human serum. An 18–24 hour culture incubated at 32° C. was centrifuged at a low speed and then the sedimented cells were suspended in 0.5 per cent phenol in 0.85 per cent NaCl solution so as to give an opacity comparable to a standard tube of 1 per cent $BaSO_4$ precipitate suspended in 1 per cent sodium citrate solution prepared according to H. C. Brown and Kirwan in 1915, i.e., approximately 25,000,000,000 cells per ml.

The method used for the agglutination tests was the rapid macroscopic slide method. The tests were carried out at room temperature on a piece of clean, fairly thin glass, divided into cells of $\frac{1}{2} \times 1''$ each. A 4 mm. platinum loop was used to place the suspension on the glass and then the serum, and to mix them together. From 6 to 10 tests could be carried out at one time. There was always a control serum in the same dilution as the test serum mixed with the suspension in one cell for every group of tests. The glass piece was rocked over a suitable illumination and observed for evidence of agglutination. The results were recorded usually in 60 seconds.

All the test sera were absorbed with the homologous strains and with one or more of the heterologous strains showing the strongest cross-reaction. All the studied strains were tested against all the unabsorbed sera prepared, against them after absorption with the strongest heterologous strain or strains, and after absorption with the homologous strain.

Absorption was tried first by using equal volumes of the suspension used for agglutination tests, and the serum in 1/5 dilution, the mixture to be kept for 1 hour at room temperature with frequent shaking, and then kept in the refrigerator overnight. After centrifugation, a 1/10 dilution of the serum would be obtained. This method however, was found unsatisfactory with most of the sera, and especially those prepared against the human type strains. So the centrifuged sediment was used to absorb the serum. The usual amount was the sedimented cells of a 24 hour culture in 50 ml. of trypticase soy broth suspended in 2 ml. of 0.5 per cent phenol in 0.85 per cent NaCl solution; and then 0.2 ml. of the undiluted serum was added so that the final dilution would be approximately 1/10. The mixture was kept at room temperature for 1 hour, with frequent shaking and in the refrigerator overnight. In some cases the absorption had to be repeated a second time to obtain the desired effect.

In this study a strain was not considered as identical with the type strain used to prepare the serum unless:

1. It was agglutinated when tested with the unabsorbed serum and also with the serum which had been absorbed with the strongest heterologous strain or strains in ample amounts. It would naturally be negative with the serum which had been absorbed with the homologous strain.
2. It should be capable of absorbing all the agglutinins for the homologous strain, using only just enough cells to absorb its own agglutinins from the crude serum.
3. In few cases, for confirmation purposes, complete reciprocal or "mirror absorption" was carried out by preparing serum against the strain shown by steps 1 and 2 to be identical with the type strain.

RESULTS AND DISCUSSION

The injection of living cultures intravenously at weekly intervals in the mentioned dosage was found satisfactory in producing satisfactory sera. In most of the cases 3 injections were quite enough, in a few cases one or two

further injections were needed. Most of the sera thus prepared did not show much cross-reaction with the other type strain suspensions, but all of them gave some cross-reaction with strains which proved to be heterologous. Griffith in 1934 stated that agglutinating sera invariably contained some agglutinins which acted upon heterologous members. Thus, the sera ought to be absorbed with one or a mixture of the known heterologous strains. Usually such absorption with the strongest heterologous strain or strains rendered the serum type-specific so that any strain reacting with it after such purification would prove to be identical by showing the capacity to absorb the agglutinins for the homologous strain. But this was not always the case. In some instances the strain would agglutinate with the supposedly purified serum but it would fail to absorb the homologous agglutinins from the serum. Such strains were considered not identical with the type strain used (or untyped).

In this study no quantitative titration of the agglutinins by absorption was made. Almost always the qualitative differences between strains of different types were apparent, even though with difficulty sometimes, in deciding on the identity of the strain without the necessity of titration. Stewart in 1937 titrated his absorbed sera, but he stated that his results had been so clear-cut and so persistently reproducible that the relationship might always be a qualitative one; each strain falling distinctly into one or another type, since no matter which dose was used, the serum either was or was not completely (i.e. 96.8 per cent) absorbed.

Some prepared sera remained active for 18 months when no more work was done on them. It was stated that sera can remain active for many years (Stableforth, 1946).

The use of trypticase soy broth to grow the strains at 32° C. for the preparation of agglutination suspensions was found quite satisfactory. Not much difference was noticed between it and Plastridge medium, and it had the additional advantage of being very easily prepared. In a few cases some difficulty was encountered with trypticase soy broth in which Plastridge medium either with or without the addition of 1 per cent inactivated human serum proved satisfactory. Usually the suspension would keep fairly stable and react typically for several months.

The results were usually either positive or negative in 60 seconds, which was taken as the time limit for reading. In most cases the positive results would appear in 10–40 seconds and the nega-

TABLE 1

Typing with sera prepared against the human type strains

						Typed strains		
Type strain	*Tracy*	*Robinson*	*Gleeson*	*Abraham*	*Hallett*	*Total*	*Percent*	*Untyped*
Human	7	6	6	5	3	27	87.0	4
Bovine	0	0	0	0	0	0	0	38

TABLE 2

Typing with sera prepared against the available bovine type strains

										Typed strains		
Type strain (typed)	*G19 1c*	*S84 2a*	*N49 1a*	*S104 3c*	*S101 3a*	*S107 3b*	*G42 4c*	*S102 1b*	*G2 1d*	*Total*	*Percent*	*Untyped*
Human	0	0	0	0	0	0	0	0	0	0	0	31
Bovine	10	6	6	4	2	2	2	1	1	34	89.0	4

tive cases would show no clumping even after 2 minutes' rocking of the glass piece, when the drops would be about to dry out.

Tables 1 and 2 represent a summary of the results. Of the 31 human strains studied, 87 per cent fell into one or other of the five types reported among the human group B streptococci, and none of the 39 bovine strains studied could thus be typed. Conversely, none of the human strains could be typed with sera prepared against the available bovine type strains, while 89 per cent of the bovine strains were so typed.

Among the strains sent to us by Dr. Plastridge were the strains "H 36 B" and "O 90 R." The first strain was originally isolated by Brown from a human source and he designated it "Baby B." It was sent to Lancefield, who gave it the present designation and Plastridge received it from the latter. It is used in America as one of the type strains for bovine streptococcal typing: type "4 b." In this study it was found to be identical, by reciprocal or "mirror" absorption, with Simmons' type "Robinson." The serum prepared against it, as well as the one against "Robinson," failed to type any of our bovine strains. But the same 6 human strains typed by the serum against "Robinson" proved to be identical with "H 36 B." It is noticed that the type represented by "H 36 B," namely type "4 b," was reported only in the United States and Canada. Lancefield in 1934, Plastridge and Hartsell in 1937, and Plummer in 1941, using the precipitation method, and Plastridge and Banfield in 1940, using the agglutination method, reported this type among the bovine strains.* To date it has not been reported in other parts of the world. Incidentally, both "Robinson" and "H 36 B" are in Brown's fermentative group "lactose —, salicin +," which has not been found naturally in bovine sources. The same statements apply more or less to the strain "O 90 R," which failed to type any of our bovine strains, even though it did not belong to any of Simmons' five types. This strain is also of human origin, one of Aronson's scarlatinal strains received by Lancefield from Todd as "O 90" (Todd, 1930). It is used to represent type "4 a," which is reported among the bovine strains only in America. Strain "K 107," which was isolated by Jones from a bovine mastitis case, was found by Lancefield in 1938 to be typical for her type "I a," and she used it in absorption experiments as a homologous strain instead of the type strain "O 90" on account of the great difficulty of sedimenting the latter in the centrifuge. In our hands this strain could not be typed with the serum prepared against the strain "O 90 R."

Our results are in full agreement with those of Simmons and Keogh, and it seems justifiable to draw the same conclusions as they did that the group B strains found in man are human parasites independent of any bovine source, and that the bovine strains are seldom if ever derived from human sources. This would indicate that the group B streptococci harbored in the human throat are not a common cause of bovine mastitis, but does not eliminate the possibility of transmission of bovine group B streptococci from cow to cow by the hands of the milker. It must also be remembered that Little in 1938 did succeed in producing mastitis in cows experimentally inoculated with strains of human origin. Also, as was mentioned by Brown in 1945, our strains and the Australian strains of Simmons and Keogh were not isolated from persons who were in contact with cows.

Analytical study of the results found

* For history and comparison of type designations see Stableforth in *Symposium on Bovine Mastitis* (Little and Plastridge, McGraw-Hill Book Co., Inc., 1946).

in this work (both this paper and the previous one) showed that the correlation between the serological typing and Brown's fermentative grouping of the strains of human and bovine origin was not complete. This is not in agreement with Stableforth's statement that strains of the same serological type are alike biochemically and that strains of different biochemical groups are never alike serologically (Stableforth, 1932). All that can be said according to our results is that most of the strains belonging to a serological type are alike biochemically, but there are some exceptions. Simmons and Keogh in 1940 found one strain in their type "Abraham" which was lactose-negative, while 45 were lactose-positive. Brown in 1939 stated that no close correlation of the sources, fermentative characters, and serological types was apparent.

It should be mentioned that three strains in this study are salicin-negative, which were in Brown's original study salicin-positive. The loss of the power to ferment salicin is apparently permanent and the change does not appear to affect the serological characteristics. One of the 3 strains, namely "V 9" still belonged to type "1 c" to which it belonged when it was typed by other workers and when it was "lactose +, salicin +." The other two strains have already been discussed in paper I. It would not appear strange to find strains of the same serological type differing in one fermentative character, since this does not seem to be a more stable property than the power to hemolyze red blood corpuscles in blood agar plates and yet, both hemolytic and nonhemolytic strains are found in the same serological type sometimes with the same frequency. In our collection, only beta strains were encountered in types "1 a," "3 a," "3 b," and "3 c," but this may not be significant since the number of strains in each type is not large enough.

2. Precipitation Tests

The precipitation methods were used for two purposes in this study, first to group all the freshly isolated strains and those received from other places, and second to type some of the strains to find out whether the results so obtained were in agreement with the agglutination methods.

In performing the group precipitation tests, the microscopic method described by Brown in 1938 was used. The antigen was prepared from the sedimented cells of a 24 hour culture of the strain in 5 ml. of 1 per cent dextrose in infusion broth by extracting with hot hydrochloric acid. The group sera used were commercially available and only anti-sera for groups A, B, and C were used. Two mm. loopfuls of the serum and the extract were mixed on ruled squares on the inside of the bottom of an optically plane Petri-dish which was then inverted into the lid, which was lined with moist filter paper. Examination was made under the 16 mm. objective of the microscope with suitable light after 1, 5, 15, 30, and 60 minutes.

All the strains examined were proved to belong to group B before being included in this study. In positive cases usually definite flocculation appeared in 5 minutes and quite often it became visible to the naked eye in 15–30 minutes.

The type precipitation tests were carried out in only a few instances to confirm the agglutination results or otherwise. The antigen was prepared by Lancefield's method of concentrating the active type-specific substance "S" accomplished by fractional precipitation with 95 per cent alcohol. The sera used were prepared as described before for the agglutinating sera. The tests themselves were carried out in precipitin tubes with undiluted serum added and layered to serial dilutions of the extract. The dilutions used were 1/1, 1/4, and 1/16. Controls with salt solution plus

serum and with extract plus normal serum were included. Readings were taken after standing at room temperature for 1, 20, and 60 minutes, then the tubes were shaken and refrigerated overnight and readings were again made.

In positive cases a ring was formed between the serum and the extract, and a precipiate was apparent after 24 hour refrigeration. Absorption, when necessary, was done by the packed cells centrifuged from a 24 hour culture in 150 ml. of trypticase soy broth, quite often absorption had to be repeated. From the results of the tests carried out, it can be safely concluded that they agree with those of the agglutination tests.

SUMMARY (of both papers I and II)

1. The biochemical properties are of help in differentiating between group B streptococci of human and bovine origin, especially if they fail to ferment lactose (human) or salicin (bovine). No single cultural test is conclusive to decide on the source of one strain.

2. It seems necessary to use some other method to differentiate between biochemically similar strains. Serological tests offer such a means.

3. Three strains were encountered in this study which had lost the power to ferment salicin, shown to be present in previous studies. Two of them are now lactose — , salicin — , a reaction which is not found in nature in this group of streptococci.

4. The serological reactions seem not to be changed by this loss of power to ferment salicin. This is definitely shown in one strain, namely "V 9."

5. No quantitative titration of the agglutinins in the sera was made. The qualitative differences between strains of different types were almost always apparent.

6. Most of the strains belonging to one serological type are alike biochemically, but this is not always the case. A few exceptions are encountered both among human and bovine strains.

7. The bovine strains are serologically distinct from the human strains.

8. The two strains "O 90 R" and "H 36 B" used in America as type strains for types "4 a" and "4 b" for bovine mastitis group B streptococci are derived from human sources. None of our bovine strains was typed with sera prepared against them, while 6 of our human strains were identical with "H 36 B" (Simmons' type "Robinson").

9. It seems justifiable to conclude that group B strains found in man are usually human parasites independent of any bovine sources, and the bovine strains are seldom if ever derived from human sources.

10. The few precipitation tests carried out give results which agree with those obtained by agglutination methods.

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An Environmental and Sociological Study of Rheumatic Heart Disease

In School Children from Four Connecticut Communities *

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As rheumatic fever is not a reportable disease in many areas of the country, there are still no accurate data on its general prevalence in urban and rural areas in the United States. Three practical though crude methods for determining the prevalence of this disease exist as substitutes for reporting, but none is adequate. These are: the collection of local hospital statistics on the annual number of admissions for rheumatic fever, the analysis of mortality rates from heart disease in the age groups 5–25, and the examination of representative population groups such as school children, to determine the prevalence of rheumatic heart disease. All three methods have been tried by this department, but the last method has been used for epidemiological studies carried out here and elsewhere, during the past sixteen years.[1, 2]

Surveys of this type conducted in 1940[3] and again in 1946–1947[4, 5] provided information on the prevalence and distribution of rheumatic heart disease within the State of Connecticut for these years, and, with a few notable exceptions, revealed a fairly even rate. But it was demonstrated by two different groups of observers, that the rheumatic heart disease rate for 7th and 8th grade school children in the small industrial city of Ansonia, Conn., was uniquely and significantly higher than elsewhere in the state, recalling findings reported from England some 20 years ago, that rheumatic heart disease and acute rheumatism were much more frequent in the poorer children of industrial towns than among other groups.[6, 7]

The present study was undertaken in 1948, primarily to check the validity of this high rheumatic heart disease rate in Ansonia, and to analyze factors which might influence the prevalence of rheumatic heart disease within that community. It called for the examination of *all* available local 7th and 8th grade school children. In addition, two adjoining industrial cities, Derby and Shelton, were included in this survey for comparison, together with a fourth city, Milford, Conn., of comparable size but chiefly residential in nature (see Figure 1). The attempt was then made to look for any relationship which poor housing and crowding in the home might bear to the high rheumatic heart disease rates. It is recognized that these two factors, housing and crowding, are only rough indicators of the home environment of the child. Such factors could include diet, economic level of the family, general care of the child, as well as the total

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FIGURE 1—Geographical location of the four Connecticut Cities chosen for Study indicated on the left half of the map.

environment outside the home, but they could not be covered in this study.

Description of the communities—Ansonia, Derby, and Shelton, three adjoining industrial cities in the southwest corner of Connecticut, equidistant from New Haven and Bridgeport, are located at the junction of the Naugatuck and Housatonic Rivers about five miles from Long Island Sound. The population composition of Ansonia (19,210 inhabitants) includes 24 per cent foreign born and from 6.9 per cent to 8 per cent Negro.* Derby (with a population of 10,287) has 23 per cent foreign born and 0.6 per cent Negro. Shelton (with

* Population statistics quoted in this paper are based on figures from the Bureau of Census Figures for 1940. Post-war estimates have been calculated locally by rough measurement.

FIGURE 2—Typical or average river front tenement dwelling in the industrial cities designated as the A-D-S region.

a population of 10,971) has a lower percentage of foreign born, 20 per cent, and 0.3 per cent Negro. Italian, Polish, Ukrainian, and Hungarian are the predominant nationality backgrounds in the A-D-S area.* The majority of the adult wage earners in these three industrial cities are employed in local factories, and, as will be considered later in more detail, a large segment of the population live in homes judged to be inadequate by good housing standards. Poorer housing and lower rentals paid in A-D-S probably reflect a lower average family income than in Milford. Although no figures were available, it was the impression of the observers that there were more *multiple* dwellings in the A-D-S area than in Milford (see Figure 2 showing a typical river front tenement in Ansonia). Compilations from the Bureau of Census figures for 1940 indicate that density of population for the combined A-D-S area was about three times greater than in Milford, implying more crowding in the former area.

Milford, chosen as a control city, with a population of 16,439, is about 8 miles from the A-D-S area. Although the majority of the wage earners are employed in industry in nearby cities, Milford is primarily a residential rather than industrial city. Many types of nationality backgrounds are represented with a smaller number of foreign born, 13 per cent, and Negro, 1.2 per cent. On the whole, the Milford housing is remarkably good, and in this survey less crowding was noted than in the A-D-S area. (See Figure 3. Typical one and two family dwelling houses in Milford.) In this city many of the poorer dwellings, summer beach homes, are located near Long Island Sound, but there was no concentration of rheumatic cases in that vicinity.

METHODS

The attempt was made to examine all 7th and 8th grade school children attending the public and parochial schools

* A-D-S refers to the three cities of Ansonia, Derby, and Shelton, which have a total population of around 40,500.

FIGURE 3—Typical and average street of single and multiple family dwellings in the non-industrial city of Milford.

in the four cities under study. Actually this covered almost all the children of this age group for there were no private grammar schools located in these communities and very few children attended such schools elsewhere. Consequently, between 90 and 95 per cent of all available 7th and 8th grade pupils were interviewed and examined. The age range was from 10 to 18.9 years with a mean average of 13.7 years, a median of 13 years and a mode of 12.5 years. There was no significant difference between the mean ages and age range of the children examined in the four cities. The group selected was representative of children who have passed the period of high susceptibility to rheumatic fever and who may have developed rheumatic heart disease.

Physical examinations * were confined to the cardiovascular system and were performed by one physician (RWQ). The children were undressed to the waist and a careful stethoscopic examination of the heart was performed with the child standing, lying down, and in the left recumbent position, both before and after exercise when indicated. An attempt to estimate heart size was made by measuring the point of maximal impulse. Gowns were furnished for the girls and screens were used to insure privacy. School nurses assisted with the examinations.* All cardiac suspects were reported to the Division of Crippled Children, Connecticut State Department of Health, as well as to the respective school physicians.

Organization — Interpretation of the survey to school and health representatives of each community involved letters and personal interviews with all persons concerned. Medical and social data were taken and recorded by one of the survey physicians (SJL) and the social worker

* Methods were similar to those previously used by this department.[4, 5]

* Acknowledgment is made of the assistance of the school nurses, Miss Mae Gaffney of Ansonia, Miss Genevieve Rak and Miss May Donahue, of Derby, and Mrs. Elizabeth Cole and Miss Grace Foran of Milford.

(JPQ). Information was coded on history forms and later tabulated by means of IBM cards. Statistical significance was determined by means of the chi square test.

CRITERIA

Diagnostic criteria—In a survey of several hundred children, diagnoses were necessarily based for the most part on a single examination. When there was doubt about a diagnosis, several examinations on different days were made in an effort to rule out error. The diagnosis of rheumatic heart disease was established when the following criteria were fulfilled:

Mitral insufficiency was considered to be present when a relatively high-pitched, moderately loud to very loud, grade 4 to 6, apical, systolic murmur beginning early in systole and transmitted to the left axilla was heard. Enlargement of the heart was not required to complete the criteria for making this diagnosis.

Mitral stenosis—This diagnosis was made in the presence of a soft to moderately loud, low-pitched, rumbling, diastolic, apical murmur with or without presystolic accentuation. The second sound in the pulmonic area was accentuated.

Aortic insufficiency was indicated by a soft to moderately loud, high-pitched, blowing, diastolic murmur heard loudest in the 3rd and 4th left interspaces along the left sternal border and occasionally over the sternum. This murmur was heard best with the patient's breath held in expiration with the diaphragm chest piece of the stethoscope. Increased pulse pressure, a water hammer (Corrigan) pulse, capillary pulsation, and pistol shot sounds over the femoral arteries were not often found as might be expected in this age group but when present they helped to establish the diagnosis.

Unexplained or functional murmurs were nearly always systolic in time. They were soft to moderately loud and were heard most frequently at the base in the pulmonic area, next most frequently medial to the apex and least frequently along the left sternal border. These murmurs were well localized and rarely were accentuated by exercise. They often disappeared or became softer following change of posture.

Potential heart disease—Patients who gave a history of rheumatic fever but in whom there was no evidence of rheumatic heart disease were classified as having potential heart disease. This term appears in Table 1 but no further use was made of the data because the authors considered most of the children's histories to be unreliable.

Possible heart disease—Children who had murmurs and other physical findings suggestive of but not absolutely characteristic of rheumatic heart disease were recorded as having possible heart disease.

Congenital heart disease is not always characterized by clear-cut signs and it is not always possible to establish an anatomical diagnosis on the basis of physical findings. However, when the murmur and physical findings were characteristic this diagnosis was made.

Possible congenital heart disease refers to those children in whom the findings were suggestive but not absolutely diagnostic for congenital heart disease.

CRITERIA FOR MEASURING ENVIRONMENTAL CONDITIONS

1. *Crowding in the home*—Crowding within the home was measured in three ways. A home was considered crowded when there was more than one person per room. Crowding in the sleeping quarters was established when more than two slept in the same bedroom. Crowding in the child's bed was said to exist when more than two slept in one bed.

2. *Rental areas*—The Area Rent Control Offices in New Haven and Bridgeport,* which had records for the A-D-S area and the city of Milford, permitted the social worker to obtain respective rentals paid by each child's parents as well as data relative to adequacy of housing. Dwellings were then classified as: (1) *inadequate*—which included mainly homes without central heating, with shared toilet facilities, and need for major improvements; (2) *passable*—most homes with central heating, private toilets, and need for major repairs met; and (3) *adequate to good*—

* The coöperation of the Area Rent Control Directors, Mr. Clarence Westerberg of the New Haven Office and Mr. Winton Hoffman of the Bridgeport was greatly appreciated.

where housing was judged as adequate or even good in respect to construction and repair.

When dwellings were owned by families and no rent paid, these homes were classified according to the rental level of the immediate neighborhood. Some rentals could not be classified at all, since no information was available for sparsely populated sections of the city.

RESULTS

General rheumatic heart disease rates—In the course of this survey extending from October, 1947, to April, 1948, 1,229 children in the 7th and 8th grades of all four cities under study were interviewed and examined. In Table 1 the rheumatic heart disease rates are listed as follows: for Ansonia 5.7 per cent (21 cases out of 366 children examined); in Derby 6.4 per cent (12 cases out of 188); in Shelton 6 per cent (12 cases in 200), and in Milford 2.5 per cent (12 in 475). The combined RHD rate for the A-D-S area was 5.96 per cent. Also in Table 1 are data on the number and per cent of children with normal cardiovascular systems, unexplained murmurs, potential heart disease, congenital heart disease and possible heart disease. There were no significant variations between the findings for the white and Negro children, or between the sexes.

Past history of rheumatic fever—from the A-D-S area 32 (77 per cent) of the 45 children classified as having rheumatic heart disease gave no past history of having had rheumatic fever or chorea. In Milford 7 (58.3 per cent) of the 12 children in the rheumatic heart disease group gave a negative rheumatic history. These estimates are in keeping with previous estimates.*

Positive familial rheumatic history—Nine (15.7 per cent) of the 57 children comprising the total rheumatic group† from the A-D-S area and Milford gave a positive family history of rheumatic fever, rheumatic heart disease, chorea or other manifestations of rheumatic

TABLE 1

Findings on Physical Examinations

	Ansonia		*Derby*		*Shelton*		*Combined A-D-S*		*Milford*		*Total*	
	No.	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
Rheumatic Heart Disease	21	5.7	12	6.4	12	6	45	6.0	12	2.5	57	4.6
OTHER FINDINGS												
Normal Cardiovascular System	154	42.0	79	42	94	47	327	43.4	249	52.4	576	46.8
Unexplained Cardiac Murmurs	159	43.4	83	44.2	66	33	308	40.8	175	36.8	483	39.3
Potential Heart Disease	1	0.3	1	0.5	0	..	2	0.3	7	1.5	9	0.7
Possible Heart Disease	27	7.4	10	5.3	18	9	55	7.3	21	4.4	76	6.2
Congenital Heart Disease	2	0.5	1	0.5	3	1.5	6	0.8	4	0.8	10	0.8
Possible Congenital Heart Disease	2	0.5	2	1.1	7	3.5	11	1.5	7	1.5	18	1.5
Total	366	99.8	188	100.	200	100.	754	100.1	475	99.9	1,229	99.9

No. = Number of Individuals
% = Per cent of total children examined

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* It should be emphasized that the medical histories taken from the children were not particularly reliable, but the results do suggest that much rheumatic fever goes unrecognized. It may be that children were not seen by their physicians during episodes of acute rheumatic fever or that the disease occurred in an unusual, unrecognized form.

† Rheumatic group includes only those children with evidence of rheumatic heart disease.

fever, whereas 62 (5.3 per cent) of the 1,172 non-rheumatics from all four cities gave a positive history for the same conditions. These differences are statistically significant.

Housing conditions—At the outset it seemed important to learn more specifically in the case of the rheumatic child the exact address where he was living when he became ill with rheumatic fever. In some cases this address would vary from the one where he had lived predominantly for the past 8 years. The effort was made, therefore, to determine the residence for as many children as possible during the period of high susceptibility to rheumatic fever; namely, the ages of 6 through 13. Consequently, *past* addresses were obtained for the years 1940–1948. In cases where the children moved frequently within a city or from one city to another, the type of residence in which the child had spent the longest period of time was chosen as the primary, past address.

Past residence—These data appear in Figure 4. A glance at this figure reveals that there were relatively more poor grade houses inhabited by children during 1940–1948 in the A-D-S district than was the case in Milford. Furthermore, the per cent of the rheumatic group who lived in these poor houses in the A-D-S district at this time was con-

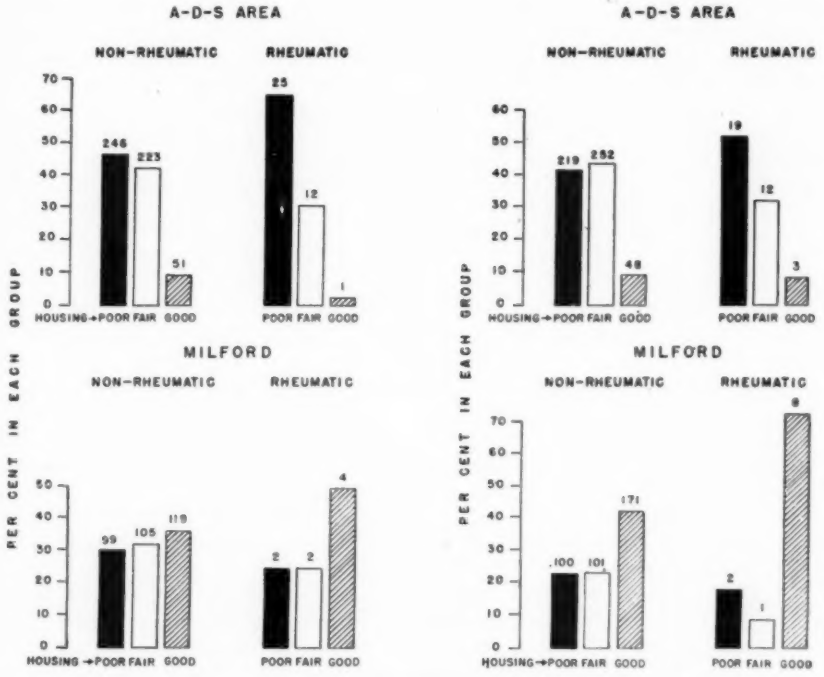

FIGURE 4—The per cent of non-rheumatic and rheumatic children found to be living or to have lived in poor and good houses in the A-D-S area and in the control area of Milford. The data on the *past residence*, on the left, covers the period 1940–1948; and that of the *present residence*, on the right, concerns the house occupied at the time of the survey in 1948.

siderably higher—65.8 per cent—than was the case in Milford—25 per cent. One can also say that the distribution of rheumatic children in the poorest housing from all four cities was significantly higher than in passable and good housing combined. But beyond this the correlation is not consistent, for one sees in Milford, for instance, that most of the rheumatic children lived in what were classified as good houses.

Present residence—When the children were located according to their *present* residence, considerable difference in the grades of housing between the A-D-S and Milford communities was again demonstrated. The resulting figures were essentially similar to those for past addresses and again indicated that a greater percentage of rheumatic children in A-D-S were living in inadequate housing than was the case in Milford. Here data also indicate that housing had improved in Milford for the group examined but had not changed much in A-D-S.

It will be seen, therefore, that the correlation between poor housing (both past and present) and rheumatic heart disease was suggestive in a number of ways, particularly in the A-D-S area, but by no means did the correlation always hold true when the control city was taken into account.

Crowding in the present residence—These data are listed in Table 2 where italicized totals reflect the significant differences between crowding in the home, bedroom, and bed of the rheumatic and non-rheumatic children. When the housing status of the rheumatic children in A-D-S and Milford was compared, what may be important is that in Milford the homes of the rheumatic children were consistently more crowded than was the case with the non-rheumatics. In other words, one is inclined to suspect that when living conditions were otherwise good, or average as compared to the rest of the local community, crowding in the home seemed to manifest itself as a significant factor.

TABLE 2

Crowding in the Present Home

Home

	A-D-S			Milford		
	Crowded	*Total*	*%*	*Crowded*	*Total*	*%*
Rheumatic *	17	45	37.8	7	12	58.3
Non-rheumatic	256	650	39.38	84	475	17.68
Total	273	697	*39.1*	91	487	*18.6*

Bedroom

	A-D-S			Milford		
	Crowded	*Total*	*%*	*Crowded*	*Total*	*%*
Rheumatic *	14	45	31.1	1	12	8.3
Non-rheumatic	144	641	22.46	40	436	9.2
Total	158	686	*23.0*	41	448	*9.1*

Bed

	A-D-S			Milford		
	Crowded	*Total*	*%*	*Crowded*	*Total*	*%*
Rheumatic *	19	45	42.2	3	12	25.0
Non-rheumatic	281	651	43.16	105	436	24.08
Total	300	696	*43.1*	108	448	*24.1*

* Rheumatic refers to Rheumatic Heart Disease only.

Size of family *—The average number of persons per family in A-D-S (5.39) was similar to the average number per family in Milford (5.25). Likewise, the average size of the rheumatic family in A-D-S (5.73) was not significantly different from the size of the rheumatic family in Milford (6.79). But the foregoing figures indicate that rheumatic families were larger than non-rheumatic families in both areas, particularly in Milford where the difference was two persons. This may well be a significant fact recalling in some respect the recent conclusion of Hammon[8] from his geographical and sociological studies on poliomyelitis and streptococcal infections: that the opportunity of having infection introduced into a family increases with the number of children.

DISCUSSION

In the present study a high rheumatic heart disease rate of 6 per cent was found for 7th and 8th grade school children living in the three small adjoining industrial cities in Connecticut. This corroborates the previous findings for a smaller sample of children studied in 1946–1947 and suggests that the previous sampling methods were adequate.[4, 5]

In sharp contrast to the high 6 per cent rate of rheumatic heart disease in the three industrial cities was a lower or average rate of 2.5 per cent in the nearby non-industrial city of Milford. This lower Milford rate is equivalent to the average figure for the State of Connecticut and to that found in larger neighboring cities.[4] These findings, although not nearly so striking as those reported from England a generation ago, do recall those by Savage which indicated the rheumatic heart disease rates to be from 3.5 to 6 times higher in the city of Bristol than the surrounding counties,[6] and by Glover who stated that in England acute rheumatism "falls perhaps 30 times as frequently upon the poorer children of the industrial towns as upon the children of the well to do."[7]

But an explanation to account for such differences between the prevalence of rheumatic heart disease in the A-D-S areas as contrasted to the prevalence rates for Milford cannot be easily found. It does not seem to lie in the racial composition of the population. It is true that the city of Ansonia had a relatively high percentage of Negroes (a group which some might consider to be particularly susceptible to rheumatic fever), but on the other hand, Derby and Shelton with equally high rheumatic heart disease rates had small Negro populations. As noted throughout the study, Ansonia, Derby, and Shelton are primarily factory towns with a higher percentage of foreign born and a lower standard of living there than in the control city of Milford which had fewer foreign born and a population not dependent on a few local industries for economic well-being. Also, the two factors of substandard housing and crowding were far more frequent in A-D-S than in Milford, i.e., a significant environmental differential. But our data indicate that the same poor housing was not present within the rheumatic group consistently enough to say there was a direct causal relationship between it and the prevalence of the disease. Perhaps a truer interpretation of the data would be that the poorer living conditions in the factory towns was a favorable environment for the occurrence of the rheumatic cases.

Regarding crowding in relation to the rheumatic group alone, this feature was manifest in different ways — in A-D-S the bedrooms and beds were more crowded than Milford, but in Milford crowding in the rheumatic homes (number of persons per room) was greater. Indeed, within the city of Milford in

* This refers to the size of the families of the children examined.

comparing non-rheumatic to rheumatic children, crowding was over three times more frequent in the latter group. Here it might be said that the factor of crowding came to the surface (in the control city where housing was not poor) when other conditions which theoretically might predispose to the disease were not too bad. Crowding in the home occurred significantly more times in the case of the rheumatic than non-rheumatic child in a previous survey in Connecticut.[4, 5] It can in turn be related to family size to which attention has been called.[8]

In general, therefore, the high prevalence of rheumatic heart disease in A-D-S, as compared with Milford, supports the view that rheumatic fever is prone to occur more frequently where living conditions are below par, but poor housing cannot be ascribed as a prime contributing cause, for the rheumatic child did not always come from a crowded substandard home. Two points impressed the survey workers. First, the environment of the average child, once outside the home, was much the same in both areas. The children attended crowded schools, used crowded public conveyances, and were frequently thrown into congested gatherings when seeking amusement. This observation strongly suggests the extra-domiciliary factors which probably have an important bearing on the epidemiology of the disease. Among these factors (not measured in this study) might be the prevalence of beta hemolytic streptococcal carriers in the community plus the opportunities for acquiring streptococcal disease outside the home. In this survey it was apparent that there were equalizing forces both within and without the home which brought about a certain similarity of environment for the children within each particular community. Second, living conditions have improved in these areas over the past several decades. Even though there were poorer home circumstances in the factory towns (A-D-S), the *excesses* of poverty and bad housing which were typical of slum areas in the past, were not commonly present in these communities.

SUMMARY AND CONCLUSIONS

1. An attempt has been made to study some of the environmental and sociological factors which might have a causal relationship to the high prevalence of rheumatic heart disease within a particular industrial section of Connecticut.
2. This area, composed of the three factory towns of Ansonia, Derby, and Shelton, was found in 1940, 1946–1947, and 1948, to have a high rheumatic heart disease rate of 6.0 per cent for the 7th and 8th grade school children which stood in sharp contrast to the rate found for the nearby control city of Milford, with a rate of 2.5 per cent. The latter is comparable to the average rate for other Connecticut cities as determined in previous surveys.
3. Geographically the two localities were within a few miles of each other, with the high-rheumatic-rate-district at the junction of two rivers, and Milford on Long Island Sound. Differences were that Ansonia, Derby, and Shelton were typical factory towns with a higher percentage of foreign born, whereas Milford was more residential in nature with fewer foreign born.
4. In the A-D-S district (the high-rheumatic-rate-area), there was significantly more poor grade housing than in the control city of Milford. Furthermore, the rheumatic cases were concentrated in the poorer housing sections within the A-D-S area. However, this finding was not reflected in the control city of Milford. Furthermore the individual rheumatic child from A-D-S as well as Milford, did not always come from a substandard, crowded home.
5. In the city of Milford where living conditions were in general good and the rheumatic heart disease rates were average, there was markedly more crowding in the homes (persons per room) of those who did acquire rheumatic heart disease as opposed to the situation in the homes of the non-rheumatics. Indeed the factor of crowding in the home seems in general to come to the fore more prominently than did the factor of a substandard home.

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Fellowships for Study Abroad

The World Health Organization offers to the United States an allotment for foreign study in the field of health of from nine to twelve fellowships available in 1951. A Fellowship Selection Board has been set up by the Surgeon General, made up of Dr. Joseph W. Mountin, U. S. Public Health Service; Dr. Hugh Leavell, American Public Health Association; and Dr. Walter A. Bloedorn, Association of American Medical Colleges. Dr. H. R. O'Brien, U. S. Public Health Service, is secretary.

For 1951, applications will be considered in the fields of public health administration, malaria, tuberculosis, maternal and child health, venereal diseases, sanitation, nutrition, and mental health. Work in clinical or basic medicine or in branches of public health not mentioned here may also be considered if needed for teaching or important service.

Applicants must be engaged in some form of full-time public health work, including medical or nursing education. Special consideration will be given those in charge of training centers or teachers in medical or other schools (especially in preventive medicine or tropical disease). Knowledge of the language of the country to be visited is valuable. In general, non-federal workers will be given preference.

Grants are for periods of two or three months for observation and up to twelve months for study. The World Health Organization provides transportation across the ocean and in the country visited, with a stipend of $160–$200 a month for those studying in one place and $240–$300 for those moving about. Application blanks may be obtained from the Educational Programs Branch, Division of International Health, U. S. Public Health Service, Washington, D. C. Applications must be filed in triplicate by January 1, 1951.

Seasonal Distribution of Poliomyelitis*

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THERE are certain epidemiological features of poliomyelitis which have been so frequently and so generally observed that they are recognized as characteristics of the disease. One such characteristic is a tendency for the seasonal variation of poliomyelitis to be slight in the tropics, with a tendency for outbreaks to be confined to the warm months of the year as one proceeds either north or south from the equator. It is this epidemiological feature of the disease which will be here discussed, not with a view to explaining minute variations or exceptional occurrences but from a rather broad viewpoint, i.e., to observe the forest rather than the individual trees.

Means of Transmission — Any discussion of the seasonal incidence of a disease must consider the method of transmission. Contact, arthropods, food, and water are all recognized as possible means for the transmission of poliomyelitis. The space allotted for this discussion will not, however, permit a detailed consideration of available evidence bearing on these several possibilities. While it must be admitted that occasional cases may be acquired by each of these methods, the evidence, at least to my mind, is overwhelming in indicating contact as the one common means of transmission, especially such close personal contacts as occur within a household.

We are therefore confronted with the difficulty of explaining why poliomyelitis, a disease transmitted by close contact, should be most prevalent in that portion of the year when people spend most of their time in the open and why it should tend to wane rapidly when cool weather induces people to congregate indoors in search of warmth, a behavior quite in contrast to other contagious diseases such as diphtheria, measles, etc. Several theories have been suggested in an effort to explain this anomaly of poliomyelitis outbreaks:

1. Poliomyelitis virus has been assumed to be capable, in warm weather, of multiplication outside susceptible human cells, possibly in fecal bacteria, Franconia and Zellweger 1942,[1] or in water protozoa, Kling, Olin, Fahraeus and Norin 1943,[2] or that the virus is a filterable phase of the streptococcus, Rosenow 1944.[3] The failure to demonstrate multiplication in such organisms was explained by Gard (1943)[4] by assuming that a mutation from an inactive intestinal virus to an active central nervous system virus occurred along the way. Not only is direct proof of these assumptions lacking, but on this theory the increased summer incidence would probably be food—or water-borne which is not compatible with the epidemiology of poliomyelitis.

There is considerably more circumstantial evidence tending to incriminate certain filth-associated arthropods as transmitters of the disease. There are, however, certain factors which are incompatible with this assumption, for instance: (a) the world-wide distribu-

* From the Don W. Gudakunst Memorial Lecture given at the School of Public Health, University of Michigan, Ann Arbor, Mich., May 8, 1950.

tion of the disease, (b) the failure of poliomyelitis to lessen in cities where flies have been greatly depleted over the years by the elimination of horses and the installation of modern sewerage systems, (c) the immunological pattern of the disease in the population, and (d) the occurrence of winter outbreaks.

2. A second theory is that of Aycock 1930,[5] who attributes the summer incidence to an assumed lowering of resistance due to failure of the human defense mechanism to adjust itself to the sudden change from a cool to a warm season, especially when the temperature variation tends to be great. Peterson in 1942[6] proposed a similar theory and attributed the lack of resistance in late summer and fall to a diminishing duration of daily sunshine, which reduction begins in the northern hemisphere about June 21 and in the southern in December. These assumptions of Aycock and of Peterson are more in accord with epidemiological evidence because they assume infection to be by contact; however, no variations in host susceptibility to, or infectivity of the virus sufficient to account for the seasonal incidence in man have been observed in experimental studies. Furthermore, these hypotheses leave us with the difficulty of explaining why so fundamental a mechanism as that of resistance to disease should behave seasonally in poliomyelitis in one way and with most other contact diseases in another. Especially does this appear difficult in view of recent developments which have tended to bring the immunological behavior of poliomyelitis into line with that of other contact diseases.

3. There is, however, a third possibility, namely, that the usual portal of effective entrance for the virus of poliomyelitis in man may tend to be more permeable during warm weather than in cold. It is this possible explanation for the seasonal variation of poliomyelitis which will be here considered.

Portal of Entrance and Seasonal Incidence of Poliomyelitis—The assumption that the seasonal incidence of poliomyelitis depends upon variations in the permeability of the usual portal of entry for the virus does not require the assumption of any extra human source of multiplication for the virus or of any seasonal alteration in the basic resistance of the population, or any seasonal variation in the infectivity of the virus. It does, on the other hand, relate the observed seasonal variation to an external mechanism more directly in contact with variable seasonal factors of our environment—factors which are capable of producing observable alterations. For instance, it is a rather general experience that nasal and throat secretions tend to be more copious in cool weather after fires have been started than is the case in warmer portions of the year and upper respiratory infections tend to be more prevalent. Let us therefore consider the nasal secretions.

Specific Antibodies in Nasopharyngeal Secretions—Amoss and Taylor (1917),[7] Howitt (1937),[8] and Bell (1948),[9] demonstrated the presence of specific antibodies against poliomyelitis virus in the nasal secretions of a portion of the persons examined, and the latter two authors demonstrated that the content of antibodies in the secretions tended to vary with the content of antibodies in the serum, but at a lower level. We have recently demonstrated that nasal washings taken on the same individual when the mucous membranes were quiescent, and when stimulated to secretion by an experimentally induced upper respiratory inoculation, showed a higher content of antibodies in the latter washing,[10] indicating that the antibody content persisted with the induced secretion and was not simply diluted by it. In winter, the breathing of cool air of low humidity would tend to con-

centrate existing secretions through drying. Thus, it is conceivable that some persons who might upon exposure become victims or carriers of the virus in summer would tend to spread no virus or a neutralized one in winter.

The problem which we are considering, however, would appear to be largely concerned with persons in whom specific antibodies are lacking.

Nasopharyngeal Secretions of Non-Immune Persons—The normal mucous secretions long have been considered to be a protective mechanism Florey,[11] and are present throughout the respiratory and alimentary tracts. Considering either location as a possible portal of entry, the upper respiratory tract appears to be more directly exposed to climatic variations than is the alimentary tract. To this extent, the concept under consideration would appear to favor the nasopharynx as the more probable portal of entry and of exit for the virus effective in the spread of poliomyelitis. This possibility is supported by the fact that the virus has been frequently demonstrated in the throat for a few days before to a few days after onset of symptoms, a period which has, on epidemiological grounds, come to be considered as the infectious period of the disease.[12-16, etc.]

The occurrence of poliomyelitis following tonsillectomy,[17-21] and certain experimental evidence also support the nasopharynx[22, 23] as a possible portal of entry for the virus.

Nonspecific Action of Mucin—Nungester, Wolf, and Jourdonnais (1939)[25] demonstrated that certain bacteria, harmless to experimental animals, when injected intraperitoneally in ordinary diluents became rapidly lethal when 5 per cent of gastric mucin was incorporated with the same dose of organisms.

Various explanations for this observed fact have been suggested, the simplest of which is that mucin acts by coating the bacterial cells and possibly the peritoneal cells as well, so that the organisms are protected from the animal's cellular and perhaps other defense mechanisms while remaining in an environment suitable for their multiplication.

Now, if this simple explanation be wholly or in part correct for bacteria, it appears that the effect might be reversed in case of a virus, which must come in close contact with and enter a susceptible cell before multiplication can occur. The avidity with which a mucin containing solution clings to dry glassware and its facility for plugging siliceous filters suggests that mucin might hold in addition an attraction for negatively-charged virus particles.

Certain it is that poliomelitis reaches its highest incidence in temperate climates when upper respiratory infections are at their lowest ebb and secretions from the membranes are tending toward a minimum. Whether the nasopharyngeal secretions have any such action as suggested or not, the presence of an abundant secretion on a surface would certainly tend to dilute and to carry away any accompanying virus.

Let us now consider the upper respiratory passages when such natural irritants as cold, drying or upper respiratory infections tend to stimulate secretions.* In cold weather the atmosphere, whether warmed artificially or by inspiration, suffers a drop in relative humidity with a corresponding tendency to take up moisture and thus to stimulate normal membranes to additional secretion, which secretions tend to be concentrated through drying while common upper respiratory infections show a tendency to develop.

In warm weather the temperature of the atmosphere and its relative humidity are less altered by inspiration

* It has been demonstrated that mucous secretions are stimulated by locally acting irritants rather than by nerve impulses (Florey[26]).

and as commonly observed, upper respiratory secretions and common infections are at a minimum while poliomyelitis tends to reach its greatest prevalence.

Atmospheric temperature in cold weather is far more subject to artificial regulation than is humidity; therefore, it might seem possible that under actual conditions of living as in the United States, atmospheric humidity is more important in influencing susceptibility to exposure than is temperature.

There is, however, a striking correlation between seasonal (summer) temperatures and the occurrence of poliomyelitis as noted in temperate climates; the correlation with atmospheric humidity is, however, less apparent. In so far as atmospheric variations may directly affect the respiratory membranes, it is evident that it is the conditions of the air within the respiratory tract and not at some weather station, that are of significance. We must, therefore, take into consideration the effect of warming the atmospheric air to the temperature of air within the respiratory passages. The expired air is always at a temperature of about 90° F. and 90 per cent saturated with moisture. It is therefore the difference between the absolute humidity of inspired air and the absolute humidity of 90 per cent saturated air at about 90° which measures drying effects on the mucous membranes. A striking correlation between absolute humidity and the incidence of poliomyelitis is clearly apparent.

Relative Humidity of Inspired Air at a Given Temperature—Through the courtesy of Dr. W. D. Woods of the U. S. Weather Bureau, tables showing the average monthly temperature and relative humidity were secured for Washington, D. C., during 1949.

From these data it was possible to

FIGURE 1

AVERAGE MONTHLY ATMOSPHERIC TEMPERATURE, AVERAGE MONTHLY RELATIVE HUMIDITY AT ATMOSPHERIC TEMPERATURE (7 AM.) AND ATMOSPHERIC RELATIVE HUMIDITY ADJUSTED TO TEMPERATURE OF 88° F., AND POLIOMYELITIS CASES BY MONTH OF ONSET WASHINGTON, D. C., 1949

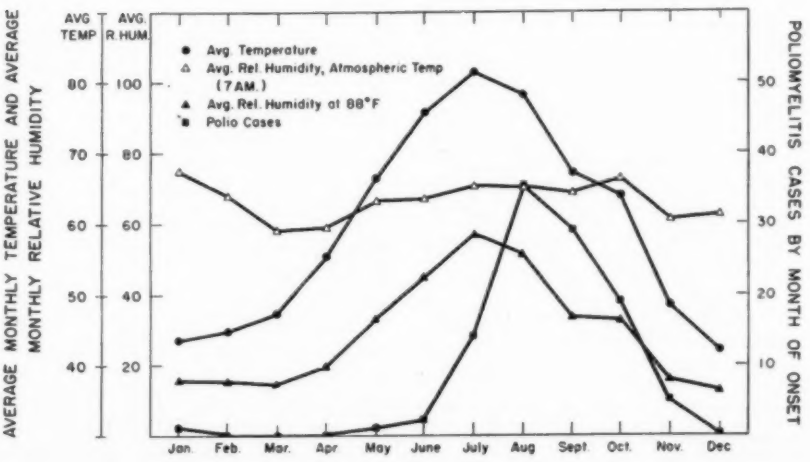
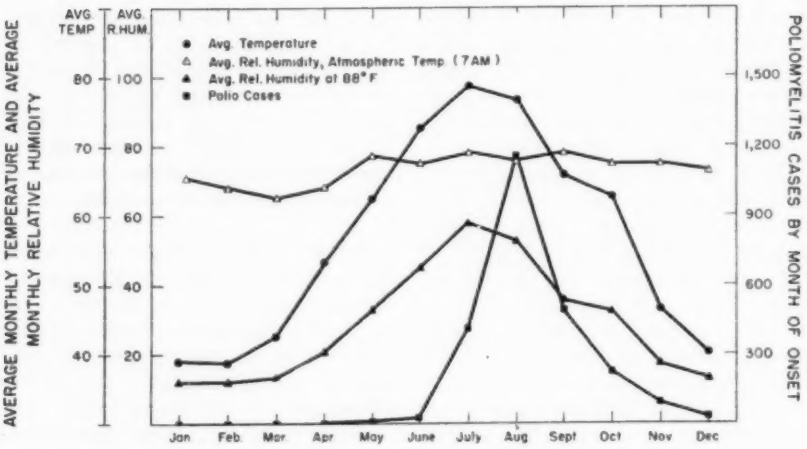


FIGURE 2

AVERAGE MONTHLY ATMOSPHERIC TEMPERATURE, AVERAGE MONTHLY RELATIVE HUMIDITY AT ATMOSPHERIC TEMPERATURE (7 AM.) AND ATMOSPHERIC RELATIVE HUMIDITY ADJUSTED TO TEMPERATURE OF 88° F., AND POLIOMYELITIS CASES BY MONTH OF ONSET NEW YORK CITY, 1949



determine the relative humidity of the atmosphere at any assumed temperature (which is, of course, the equivalent of absolute humidity). In Figure 1 is shown the relative humidity of the atmosphere and of the same air when warmed, as through inspiration, to an assumed temperature of 88° F.* Figure 1 also records the reported cases of poliomyelitis for Washington by month of onset for the same year. The similarity of the latter two curves is striking.

The same type of data for New York City 1949 are shown in Figure 2. Again a similarity between the curve of relative humidity at 88° F.* and for the monthly incidence of poliomyelitis is apparent.

Susceptibility to Infection—Our concept attempts to relate the summer prevalance of poliomyelitis, the development of immunity, and the regeneration of virus to the conditions which prevail at a portal of entrance and of exit for the virus, but it has nothing to do with whether effectively exposed non-immune individuals develop recognizable symptoms or simply immunity—such considerations being related to natural resistance as it relates to age, sex, overexertion, and perhaps other factors rather than to the permeability of a portal of entry.

If this simple concept is operative, it is necessary, however, to assume that it acts differently in poliomyelitis from in measles, mumps, chickenpox, smallpox, or influenza which tend toward a cool weather prevalence. This difference does not appear entirely illogical, however, since poliomyelitis virus induces recognizable symptoms by reaching susceptible cells of the central nervous system by way of nerve fibers and tracts and has no demonstrated attraction for surface cells and no demonstrated

* Other temperatures above the monthly average could have been selected without markedly altering the shape of the curve except that it would tend to be raised or lowered.

synergistic action with bacteria. The other viruses mentioned, however, are capable of parasitizing surface cells and have in some instances an attraction for certain available cells as revealed by the red cell agglutination phenomenon or a possible synergistic action with some types of the varying but ever present bacterial flora of the respiratory tract. Under such circumstances, it appears possible that the opportunities for infection to pass from one person to the next are more important in the case of those infections showing winter prevalence than are the local conditions at the virus implanted area. If the concept under consideration is, however, effective in poliomyelitis, we should expect the closer person-to-person contacts of winter to be relatively ineffective due to the relatively greater scarcity of virus during the cool portions of the year.

We have thus far stressed the possible effect of atmospheric conditions upon the nasal mucous membranes and their secretions and said very little concerning the possible effects of common upper respiratory infections which lead to cellular changes as well as to markedly increased secretions.

There is, in so far as I am aware, little direct evidence on this point, although local responses to infection are generally considered to be defensive in nature and there is indication that certain bacteria or their products may exert a hindering effect upon certain virus infections such as vaccinia,[21, 28] and mouse pneumonia.[29]

Recently a number of therapeutic agents have come into common use in the United States which exert an inhibitory effect upon several types of organisms commonly present in the upper respiratory passages. It is therefore interesting to speculate upon the possible relationship of their employment to the high incidence of poliomyelitis reported in the United States for 1948–1949 and 1950 to date.

The usual and apparently logical explanation for this situation is that it is due to the more frequent reporting of mild illnesses as poliomyelitis. This could readily explain why deaths have not risen in number as have the reported cases; however, this explanation is not conclusive since we are ignorant as to what has been accomplished, if anything, either in the treatment or prevention of the fatal types of poliomyelitis. We therefore at this time can do little more than raise the question for future study.

Experimental Evidence — In so far as the mucuous secretions are concerned, apart from any underlying cellular response, it appears that it should be possible to test experimentally some of the suggestions offered earlier as deductions.

For instance, does gastric mucin tend to snare virus particles? Tubes containing a uniform amount of poliomyelitis virus (Lansing strain) with varying amounts of mucin (0.8, 1.6, and 3.0 per cent) in buffered saline pH 7.6 and a control tube with no mucin present were centrifuged at 13,000 r.p.m. for 30 minutes, the insoluble portion of the mucin appearing to be completely sedimented. The supernatant fluid from each tube was then inoculated intracerebrally into white mice. Table 1, test 143, indicates that supernatant fluid from the tube which contained the highest concentration of mucin was least infectious. Supernatant from control tubes containing no mucin was more potent. A similar experiment was made employing herpes simplex virus with and without mucin centrifuged at 8,000 r.p.m. for 15 minutes. The results were similar to those above (Table 1, test 168).

Next, an attempt was made to see if mucin in the presence of herpes simplex virus would delay or prevent its lethal effects as compared with the same

TABLE 1

EFFECT OF CENTRIFUGATION UPON VIRUS SUSPENSIONS WITH AND WITHOUT MUCIN

TEST NO.	VIRUS	PERCENT MUCIN	ROUTE INOC.	NO. MICE INOC.	NO. MICE DEAD OF INFECTION	NO. MICE SURVIVING
143	Polio.	0.8	I. C.	12	10	2
		1.6	I. C.	12	12	0
		3.0	I. C.	12	6	6
		0	I. C.	12	12	0
168	Herpes Simplex.	0.55	I. C.	12	1	11
		1.1	I. C.	12	1	11
		0	I. C.	12	11	1
		1.1*	I. C.	12	12	0

I. C. = Intracerebral.

* This dose of virus added to supernatant following centrifugation to control effect of any soluble mucin in supernatant.

amount of virus in the same diluent without mucin, when inoculated intracerebrally into white mice. The results shown in Table 2, tests 134, 135, and 139, indicate that gastric mucin does tend to delay the death of the animals as compared with the controls and that 4 out of 30 mice which received herpes virus in mucin intracerebrally recovered while none of 43 controls survived. The animals inoculated with the virus mucin mixtures were somewhat depressed for 24 hours and it is conceivable that the reaction thus engendered played a part in the results. Mice dying within 24 hours of inoculation were discarded. Next, the effect of mucin upon herpes simplex infection of mice inoculated into the pad of the right hind foot was investigated. The results as shown in Table 2, test 161, reveal a similar significant prolongation of life and reduction in the number of deaths among mice receiving the virus plus mucin as compared to the controls.

Inoculations (0.1 ml.) into the pad of the foot develop considerable pressure and it was therefore felt that inocula-

TABLE 2

EFFECT OF GASTRIC MUCIN ADDED TO VIRUS AS REVEALED BY DEATHS OF INOCULATED MICE.

TEST NO.	VIRUS	VIRUS IN	ROUTE INOC.	REJ	DEATHS BY DAYS																					AVG. DAYS LIFE	SURVIVED INOC.
					2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
134	Herpes	S	IC.				2	4																			4 2/3	0/6
		S + M	IC.			1			2	1	1																6 1/3	1/6
135	"	S	IC.				1		3	2																	6	0/6
		S + M	IC.	1					1							1											10	3/5
139	"	S	IC.	1		1	6	3	1																		4 4/11	0/11
		S + M	IC.	4				5	1	1	1																5 3/4	0/8
161	"	B	Pad								1	2	3	6	3	1	3					1	1				12	4/25
		B + M	"											2		1		4		1			1			1	15 9/10	15/25
162	"	B	Groin										4	2	1	1	2				1						12 1/11	14/25
		B + M	"											1													11	24/25
164	Rabies	S	IC.				2		1	3	4	2															7 1/12	0/12
		S + M	IC.							3	3			1													8	5/12
163	"	S	IM.								2	4	3														9 1/9	3/14
		S + M	IM.										1														10	11/12

S = Saline M = Mucin 3 to 4 % B = Broth IC. = Intracerebrally IM. = Intramuscularly REJ = Rejected

tions into a loose tissue might simulate the conditions of a natural surface infection more closely. Twice the quantity of inoculum employed in the pad was therefor injected into the loose tissue of the groin in two groups of mice. Only 1 of 25 mice receiving the virus plus mucin succumbed while 11 of 25 receiving the same dose of virus in the same menstruum but without mucin died (Table 2, test 162).

Next, tests were carried out with and without mucin, employing the Gochenauer strain of rabies virus inoculated both intracerebrally and by intramuscular routes (Table 2, tests 164 and 163). The results were similar to those already cited and since rabid animals uniformly die the results distinctly indicate a preventive action by the mucin. All mice were observed for at least 3 weeks. Immunity tests on surviving mice have not yet been made. Herpes simplex and rabies virus were substituted for poliomyelitis in the above tests in order to escape the very variable incubation period observed with the Lansing strain of poliomyelitis in mice and because the Lansing virus is not pathogenic for mice by other than intercerebral routes. The mucin employed was granular mucin, type 1701-W, manufactured by the Wilson Laboratories, Chicago.

It is conceivable that this protective effect might have been even more impressive had it been possible to provide a continuous supply of fresh mucin, as would appear possible upon a mucin-secreting surface membrane, and had it been possible for excess mucin to have escaped from the inoculation site.

Accord with Experience — The suggested hypothesis appears to accord with seasonal behavior of poliomyelitis such as:

1. The behavior of poliomyelitis in the tropics.
2. The variations that occur in the incidence curves in different latitudes, for instance, the tendency for the earlier onset and later regression of poliomyelitis in the Southern United States as compared to northern areas.
3. The fact that in World War II American soldiers in the tropical orient suffered notably from poliomyelitis,[30,31] while in World War I our troops, likewise subject to exposure to troops from many lands, were practically free from the disease, notwithstanding the more rigorous climate of France and the severe exposure of trench warfare.
4. This hypothesis would appear elastic enough to permit of the exceptional seasonal incidence occasionally encountered, such as the shift of the peak incidence from one month to another in different outbreaks of the same locality as in New York 1916–1931, or the occurrence of an occasional cold weather outbreak which would be quite incompatible with transmission by any arthropod now recognized as a possible transmitter of the virus.

Bearing of Hypothesis on Control — If seasonal incidence of poliomyelitis is related, as suggested, to the conditions of a portal of entry or of exit for the virus effective in the spread of the disease, it is conceivable that such conditions might be susceptible to alterations through artificial measures which would tend to hinder effective exposure.

However, since such measures would not appear capable of influencing susceptibility once effective exposure had occurred, but might simply tend to defer infection to a later and more susceptible age period, the desirability of such procedures would at this instant appear questionable, unless it can be demonstrated that exposure under such modified conditions tends to result in specific immunization in the absence of serious infection.

At least, the concept suggests numerous lines for epidemiological and laboratory investigation, which, it is hoped may elucidate the mechanism and help to remove the mystery surrounding a baffling characteristic of poliomyelitis outbreaks.

SUMMARY AND CONCLUSION

In an attempt to explain the seasonal incidence of epidemic poliomyelitis, a

hypothesis is suggested which requires no assumptions of an extra human source or change of infectivity for the virus nor any assumed alteration in the susceptibility of the population to infection. On the other hand, it attempts to relate the seasonal behavior of poliomyelitis to generally observed alterations in the upper respiratory tract due to atmospheric changes, notably in temperature and relative humidity of inspired air. The upper respiratory passages are viewed not only as a portal of entry for the virus but also as a portal of exit for the virus most effective in transmitting the diseases from person to person.

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The Culture Method of Laboratory Diagnosis of Tuberculosis*

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FOR many years routine laboratory diagnosis of *Mycobacterium tuberculosis* was based on finding acid-fast bacilli in smear preparations. Cultural methods were used more for confirmation of the presence of tubercle bacilli rather than for their primary identification. Within the past decade, however, newer procedures and refinement and simplification in techniques have made cultural methods comparatively easy, accurate, and within the time economy of all laboratories, so that more and more laboratories have adopted the cultural procedure as a routine method. The Oregon State Hygienic Laboratory adopted the culture of tubercle bacilli as a routine procedure early in 1948, and since then has submitted all specimens received for suspected tuberculosis to the culture method. This paper presents the routine culture procedure now employed and discusses the results obtained within the past two years.

CHOICE OF CULTURE MEDIUM

Before adopting the medium to be used for routine culture of *M. tuberculosis* a series of comparative tests were run on several well known media. In addition, comparative tests were run on various digestants to determine the most suitable for our use. Choice fell on the Jensen modification of Lowenstein's medium and on trisodium phosphate.

PREPARATION OF THE CULTURE MEDIUM

The method of preparation of the modified Lowenstein's medium is that essentially described by the Tuberculosis Section, Laboratory Division of the Communicable Disease Center. The following ingredients are used:

A. Salt Solution		
Monopotassium phosphate	2.4	gm.
Magnesium sulfate	0.24	gm.
Magnesium citrate	0.6	gm.
Asparagine	3.6	gm.
Glycerol	12.0	ml.
Distilled water	600.0	ml.
B. Potato flour	30.0	gm.
C. Homogenized whole eggs	1000.0	ml.
D. Malachite green, 2% aqueous solution	20.0	ml.

The salt solution is made up in the afternoon and sterilized in the Arnold for 2 hours. It is then allowed to stand at room temperature until the following morning. The potato flour is then added to the salt solution and the mixture placed in a boiling water bath for 1 hour. This mixture is now placed in the 56° C. water bath for 1 hour, during which time the eggs are prepared.

We use fresh eggs, two dozen for one lot of medium. The eggs are cleaned by scrubbing in a green soap solution, then thoroughly rinsed in running cold water. They are then placed for 5 minutes in 70 per cent alcohol, drained and

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placed on a sterile towel. The eggs are broken into sterile beakers (three eggs to a beaker, so as to prevent contamination of the entire lot if one spoiled egg be found), transferred to a 4 liter sterile bottle and the whole thoroughly shaken until the eggs are well broken up. The salt solution potato flour mixture is now added and the entire mixture is shaken for complete homogenization. The 2 per cent aqueous solution of malachite green (previously sterilized in 20 ml. amounts) is now added, the contents again shaken thoroughly and then filtered through several layers of sterile gauze into a sterile flask. The medium is now dispensed into plastic screw capped test tubes, approximately 8 ml. per tube, and the tubes are placed in a large copper basket for inspissation.

Inspissation is carried on in a specially designed electrically heated inspissator, which can accommodate about 240 tubes. The tubes are placed in the inspissator, which has been previously heated to about 40° C., then heated for 2 hours at 87° C. Approximately 1 hour of this time is required to equalize the temperature of the inspissator and the tubes. The CDC recommends inspissation at 85° C. for 40 minutes. We have found that interval rather short; our period of heating—2 hours—seemingly gives a satisfactory medium. From each lot of medium thus prepared six tubes are taken at random and incubated for a week to detect possible contamination. Sufficient medium is prepared so that as a rule 10 days elapse between preparation and use. Each lot of medium is inoculated and under incubation by the 12th to the 13th day following preparation.

PREPARATION OF SPUTUM SPECIMEN

Trisodium phosphate was found to be an excellent digestant, less toxic to the *Mycobacterium tuberculosis* than other chemicals. According to Spendlove, Cummings, and Patnode,[1] trisodium phosphate will not kill this organism even after 72 hours exposure. This is shown in Table 1.

When we first began the use of trisodium phosphate, we placed the solution in the bottles which we send out to physicians. The bakelite screw caps on these bottles, however, were not always leakproof, so we discarded that procedure. Sputum specimens collected in sterile containers are treated with an equal or larger volume of 10 per cent trisodium phosphate, the mixture well mixed and placed in the 37° C. incubator for 3 to 18 hours for digestion. We have found muco-purulent sputa require more than an equal volume of the trisodium phosphate solution for complete digestion. The use of mechanical agitation (as with a paint-mixing machine) undoubtedly might hasten digestion and appreciably reduce the time now necessary for this operation. After digestion, the tube is centrifuged, the supernatant poured off, and the sediment resuspended in sterile saline. The tube is again centrifuged and the supernatant poured off. By means of a Pasteur pipette two culture tubes are inoculated with a portion of the sediment; the

TABLE 1

Common Digestants Used in Preculture Treatment of Sputa Listed in Order of Increasing Toxicity.

Digestant	*Concentration in the Sputum*	*Maximum exposure compatible with growth*
10% Na_3 PO_4 (23% Na_3 PO_4 —12 H_2O)	5 %	72 hours
4% NaOH	2 %	24 hours
5% Oxalic acid	2.5 %	2 hours
2.5% $(NH_4)_2$ CO_3	1.25%	2 hours
3% HCl	1.5 %	40 minutes

remainder is spread on a slide for staining. A smear is made of the untreated sputum for direct examination. The Ziehl-Neelsen stain is used exclusively.

After a series of prolonged comparative tests we came to the conclusion that reagent grade or C. P. trisodium phosphate was no better than the technical grade. The percentage of positive cultures was practically the same with one as with the other grade. Since technical trisodium phosphate costs one-tenth as much as the reagent grade a material saving can be accomplished.

INCUBATION PERIOD

The culture tubes are placed in stainless steel racks accommodating 66 tubes and are incubated at 37° C. They are inspected 2 weeks after inoculation, then once weekly thereafter for a total of 8 weeks. In the beginning of our culture work we incubated for only 6 weeks before the final reading. We found, however, that occasionally a culture showed a colony or two after an additional 2 weeks incubation. Our present total incubation period, therefore, is 8 weeks.

PREPARATION OF SPECIMENS OTHER THAN SPUTUM

Exudates, gastric fluids, stools, urine and other body fluids are digested with that amount of trisodium phosphate which will homogenize the specimen. The amount will vary with the density of the specimen, the presence of clots, etc. After digestion and centrifugation, the sediments are resuspended in sterile saline, centrifuged, and the resultant sediment inoculated into Lowenstein-Jensen medium or guinea pigs, or both.

RESULTS ON 10,280 SPECIMENS

Using the procedures described above, a total of 10,280 specimens (10,014 sputa and 266 body fluids) were examined routinely in the period covered by this report. All sputum specimens were subjected to direct and concentrate smear examinations and to culture; all body fluids to culture examination alone. The findings are given in Table 2.

Microscopic examination, including both by direct and concentrate methods, yielded 6.8 per cent positive findings, whereas the culture method gave 15.1 per cent, better than 100 per cent increase in positives, or an increase of 8.5 per cent of positives for the total number of specimens examined; 176, or 1.6 per cent of all specimens cultured, were unsatisfactory for both culture tubes, usually because of a contaminating growth of fungus or, more frequently, of a proteolytic bacillus.

Our findings seem to corroborate the opinion generally held that concentration methods yield more positive results than the direct smear. Recently Spendlove, Cummings, and Patnode,[2] reporting on direct examination of selected choice particles on 1,723 sputum specimens, concluded that such "smears gave more positive results . . . than smears made following concentration of the same specimens by the various methods of sodium hydroxide digestion used." They warn, however, that direct smears

TABLE 2

Results on 10,280 Specimens Examined for M. tuberculosis.

	Culture		*Smear Examination*					
			Direct		*Concentrate*		*Total microscopic*	
	No. Spec.	*Per cent*	*No. Spec.*	*Per cent*	*No. Spec.*	*Per cent*	*No. Spec.*	*Per cent*
Positive	1,557	15.1	480	4.7	642	6.3	**707**	**6.8**
Negative	8,547	83.3	9,800	95.3	9,638	93.7	9,573	93.2
Unsatisfactory	176	1.6	–	–	–	–	–	–

TABLE 3

Comparative Results on 1,654 Specimens Positive for Tubercle Bacilli

Positive findings by	*Number Specimens*	*Per cent of*	
		Total Positives	*Total Specimens*
Direct smear only	23	1.39	0.22
Concentrate smear only	51	3.09	0.49
Culture only	947	57.25	9.21
Direct and concentrate smears only	23	1.39	0.22
Direct smear and culture only	11	0.66	0.11
Concentrate smear and culture only	177	10.71	1.72
Direct and concentrate smears and culture	422	25.51	4.10

made by the selection technique are not so reliable as cultivation methods of isolating tubercle bacilli from pathological material.

Laboratories blessed with sufficient personnel and with ample time to change routine examinations into research projects undoubtedly can improve their findings. Laboratories such as ours, where each bacteriologist has to perform a variety of tests in a limited time, must perforce use techniques and procedures generally accepted as standard and satisfactory. We admit also that our culture results would have been more striking yet had we planted four instead of two tubes for each specimen, or had we used several culture media instead of one. Time availability and adequacy of personnel and facilities enter into the capabilities of any laboratory performing routine diagnostic work.

When the number of tubercle bacilli in any specimen is very small, chance undoubtedly plays some part in the recognition of their presence, regardless of the technique used. The chance of finding rare tubercle bacilli in a specimen is, however, tremendously enhanced if the culture method is used. Table 3 offers a striking proof of the superiority of the culture method to microscopic findings.

It can be seen that more than half of the acid-fast bacilli found would have been missed had the culture procedure not been used. On the other hand, nearly 6 per cent of the total positives, roughly 1 per cent positives of the total number of specimens, were demonstrated by microscopic examination alone. Undoubtedly if more than two culture tubes were used for each specimen the latter percentage would have been decreased. Lack of incubator space prevents the use, at the present, of more than two culture tubes per specimen; it will be seriously considered when more facilities become available.

The use of multiple culture tubes per specimen offers greater opportunity for colony and therefore type identification. True colony characteristics on the Lowenstein-Jensen as well as on any other type medium are found when the colonies are few and isolated. Another advantage of multiple tube cultures is the possibility of demonstrating positive findings even if one or more tubes show contamination. Table 4 shows that even two

TABLE 4

328 Specimens Positive on One Culture Tube Only.

2 Cultures (1 positive)	*Smear Result*	*No. of Specimens*
1 unsatisfactory	negative	19
1 unsatisfactory	positive	6
1 negative	negative	282
1 negative	positive	21

tube cultures are preferable to a single culture per specimen.

SPECIMENS OTHER THAN SPUTUM

A total of 266 specimens other than sputum were examined in the interval represented by this report. These represented a variety of body fluids. Table 5 gives the results obtained on these 266 specimens.

TABLE 5

Culture Results on 266 Body Fluid Specimens

Specimen	*Positive*	*Negative*	*Unsat.*	*Total*
Gastric washings	37	126	2	165
Urine	2	40	5	47
Chest and pleural fluids	2	25	2	29
Axillary node fluid	1	–	–	1
Miscellaneous	–	24	–	24
Total	42	215	9	266

The vast majority of gastric washings specimens were submitted by a hospital in Portland; these were brought to the laboratory by messenger which undoubtedly explains the high percentage of positive findings. Such specimens received through the mail are not always satisfactory.

It is regrettable that so many specimens received in a state laboratory are accompanied by meager—or no—information concerning the clinical history and symptomatology of the patients involved. The correlation between our positive cultures and clinical diagnosis of tuberculosis, therefore, is difficult to evaluate. There are many references in the literature which show the value of cultural methods for detection of tubercle bacilli. To quote several: Holmes [3] obtained positive cultures in over 50 per cent of so-called negative sputa, using Jensen's modification of Lowenstein's medium. She attributed her success not only to the medium but also to the use of a screw topped bottle in place of the customary test tube. Holm and Lester,[4] reporting on 20,090 specimens tested by cultivation and guinea pig inoculation, found 3,731 to contain tubercle bacilli. Of this number 2,902 were positive by guinea pig inoculation, against 3,408 positive by culture method. The guinea pig test failed in 829 instances; the culture method in 323. Sula [5] found in a study of 2,562 specimens giving negative smears but positive cultures or guinea pig tests, that the percentage of positive cultures and animal inoculations were about the same. The number of unsuccessful guinea pig inoculations, however, was twice that of the culture method. Cummings [6] states that "since the advent of mass radiography, more than ever before it is imperative that laboratories be prepared to search for tubercle bacilli by methods of cultivation."

GUINEA PIG INOCULATION

Unfortunately our laboratory has not been in a position to make animal inoculations on all specimens that we regarded as yielding questionable findings by the culture procedure. We were able to perform a very limited number of comparative studies using cultures and guinea pigs simultaneously. In all, 57 guinea pigs were inoculated in the period under consideration. Forty-eight specimens were negative by smears, culture, and guinea pig; four were positive by culture and guinea pig; two were positive by guinea pig and negative by culture; while three were negative by guinea pig and questionable by culture. The questionable cultures were slightly or markedly pigmented. One markedly pig-

mented culture was obtained successively on three sputum isolations during a year and a half from a case of pulmonary tuberculosis.

CONCLUSIONS

1. Cultural procedures for the detection of *M. tuberculosis* have long since passed the experimental stage and should be an integral part of the routine diagnostic work of any public health laboratory.
2. The Jensen modification of Lowenstein's medium has been found an excellent culture medium for the growth of *M. tuberculosis*.
3. An electric inspissator has been developed which can be used by laboratories requiring a moderate number of culture tubes.
4. An incubation period of 8 weeks is recommended before a culture is considered to be negative.
5. A minimum of two culture tubes for each specimen is considered necessary; a larger number is advisable, the number depending on the laboratory facilities.
6. In a study of 10,280 specimens examined for tubercle bacilli the culture method yielded 15.1 per cent positives, the direct smear 4.7 per cent positives, and the concentrates 6.3 per cent positives, 1.6 per cent of all specimens cultured were unsatisfactory.

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The Health Museum

For many years the American Public Health Association and the New York Academy of Medicine recognized that something should be done to popularize health education. The New York World's Fair provided an ideal opportunity, and nearly twelve million persons visited the Medicine and Public Health Building at the Fair.

Capitalizing on this demonstrated public interest, and the fact that the nucleus of an excellent permanent health exhibit was available, plans were made to open the American Museum of Health as a permanent center for dramatizing health conservation and the preservation of life. The plans, however, did not materialize because of the lack of funds, and the exhibits were loaned first to Cleveland and then to Dallas for the excellent health museums in those two cities.

Efforts are now being made once again by a group of civic leaders to secure the necessary funds to reopen the American Museum of Health in permanent quarters on the Hunter College Bronx campus. It is to be hoped that they are successful, for New York needs another museum. It needs the American Museum of Health.

—*Editorial, New York Times,* Sept. 2, 1950.

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PARACELSUS AS PSYCHIATRIST

PARACELSUS, or Aureolus Theophrastus Bombastus von Hohenheim (we cannot forego these grandly rolling syllables!) was a strange and complex figure. As Jung has said, "one cannot do him justice; one can only under- or over-value him." Robert Browning idealized Paracelsus to a point having no significant relation to reality. Bayan describes him as "a rude circuitous obscurantist, not a harbinger of light, knowledge and progress."

One of the reasons for this difficulty is that Paracelsus stood midway between two great periods of human thought. He was one of the earliest figures of the Renaissance, the age of adventure, observation, experimentation. It is this phase of his life, particularly his emphasis on pharmacology, for which he is most commonly remembered. Yet Paracelsus was also perhaps the last of the Schoolmen in the field of medicine, basing his thinking on broad philosophical concepts of the universe which tied together all phenomena as parts of an ordered whole. It is difficult to "see life steadily and see it whole." The microscope and the chemical balance make for steadiness; but we would do well to recapture today the medieval recognition that the universe is indeed a whole, not a mass of disjointed fragments of experience.

It is this aspect of Paracelsus—the conviction that, in his own words, "Man is a small world (a microcosm) a replica of the total world, the macrocosm"—which Iago Galdston discusses in a highly stimulating analysis of "The Psychiatry of Paracelsus."[1] He says that the "conviction that only the living scene in all its multiform parts and in its innumerable inter-relations and inter-actions, can provide some measure of understanding to those who are concerned with well-being and illness, in body and in mind, characterizes and distinguishes the whole of Paracelsus' thinking." This 16th century pioneer clearly recognized the difference between the feebleminded and the psychopathic. He stated that "the diseases which deprive man of his reason originate and come out of nature" and treated the idea of demonic possession with scorn. His broad concept of the relation between the microcosm and the macrocosm made it possible for him to anticipate the modern view (as stated by Galdston) that "the most common source of psychological

conflict, the most common cause of psychopathology, is the emotional dissonance between man and the world he lives in. When the individual and the society in which he lives are not in psychological harmony, the individual is likely to become sick." Even in psychotherapy, while Paracelsus advocated magnetism, bloodletting and drilling holes in the patient's skull (not wholly without modern therapeutic analogies) he also "believed in psychotherapy, in the manner practised today. He believed in persuasion, exhortation, instruction, fasting and prayer. He set great value on the therapeutic effects of sleep and advised the use of somnifacients. He believed in the self-healing powers of the soul."

Paracelsus, in the original, is not easy reading; but Galdston's essay will open vistas for any thoughtful student of the basic philosophy of health and disease. The civilization which the Western World is defending today has its roots far back in the civilizations of Greece and Rome as well as in the Renaissance and in the Great Scientific Awakening of recent centuries. Medieval thought, as represented by Paracelsus, has also factors of major importance to contribute, particularly in its recognition of the essential oneness of the universe—the wholeness which is an essential complement of the fragmented steadiness of modern science.

1. *Bulletin of the History of Medicine* 24:205 (May–June), 1950.

SMOKE CONTROL IN PITTSBURGH

AVIATORS have long recognized a major hazard in what they have called "The Great Smoke Bowl," extending roughly from Lake Erie on the northeast to Charleston, West Virginia, on the southeast, Cincinnati on the southwest and Toledo on the northwest. As one flyer has described this area, "all above me was the brightest sun and the bluest sky I ever witnessed; all around me was this huge multi-colored ring of dense smoke forming a false horizon and resembling the rim of a great bowl; and all below me was fluffy smoke blotting out the earth."

The City of Pittsburgh was one of the worst spots in this quadrangle; but, without waiting for the alarm clock of Donora, the then "Smoky City" awakened to the need for action. In 1941, a municipal ordinance was enacted which declared the production or emission of dense smoke a nuisance to be summarily abated; made it unlawful to import, sell, or use any solid fuel for hand-firing or surface-burning types of equipment which did not meet the standards of a smokeless fuel; and specifically included control of smoke from locomotives.

The application of this ordinance was begun in 1942; but was intermitted during the war and became fully effective only in 1947 (under the direction of Sumner B. Ely, Superintendent of the Bureau of Smoke Prevention). The reports of progress during the past three years are highly encouraging.[1] The records of the U. S. Weather Bureau show the following results:

Average Hours per Month of Heavy Smoke

	1945–1947	*1948–1949*
Heating season	158	77
Non-heating season	95	70

Thus, during the heating season, days of heavy smoke were reduced by more than 50 per cent, almost to the level recorded for the non-heating season. Railroad records show more than 65 per cent abatement of smoke conditions; and aviation reports indicate 75 per cent improvement in visibility at the airport. An interesting

contributory fact is that a given fuel burned in domestic furnaces in the city yields 25 per cent more residual ash than when burned in similar furnaces outside the city.

To the reader who is not an engineer, the testimony of an actual observer is even more convincing than these figures. An aviator writing to a local newspaper has this to say: "When the city of Pittsburgh put its anti-smoke law into effect, airmen regarded one another with lifted eyebrows. It always has been a grim operation to get into the 'Smoky City' airport—with clear and unlimited conditions prevailing nation-wide. The Pittsburgh Bureau of Smoke Prevention has done a perfectly splendid job in the face of very perplexing problems. Gone are the dead black days when night prevailed from sunrise to sunset. . . . From an airman's viewpoint the most remarkable feature of the smoke control in Pittsburgh is the fact that we can see the Allegheny Airport from any altitude and are unable to spot any other airport until we get beyond the confines of the Smoke Bowl—unless we are right over it."

The problem of smog is attracting wide attention in many other communities. St. Louis[2] and Baltimore[3] have recently intensified their efforts at control. Los Angeles, too, has a serious problem but of quite a different nature since oil and not coal is the fuel in use. Methods must be adapted to local conditions; but some way must be found to make "Smoky Cities" a thing of the past.

1. Pamphlets describing this work in greater detail can be obtained from Dr. I. Hope Alexander, Director of the Pittsburgh Department of Public Health.
2. *Industrial Hygiene Newsletters* U.S.P.H.S. 10:13 (July), 1950.
3. *Baltimore Health News* 27:33 (May–June), 1950.

PROGRESS IN THE WAR AGAINST CANCER

IT is encouraging to note that the program for control of cancer is advancing along many fronts.

Potentially, the most important development is the generous support provided by the American Cancer Society and the National Cancer Institute for basic scientific research which is being carried on in scores of laboratories throughout the country. No startling discoveries have yet been reported; but there seems little doubt that somewhere, some day, crucial advances will be made. We can assume with a high degree of probability that some chemical substance, or some biophysical condition removes or modifies the forces which maintain the balanced growth of certain tissue cells and permits their excessive development. The secret of this process may be found by a biochemist, a biophysicist, an experimental pathologist, or even a microbiologist working with unicellular organisms; but it will ultimately be revealed.

Next to laboratory research, one of the most promising lines of advance is in the study of occupational cancer. If the ancient and familiar problem of scrotal cancer in chimney sweeps had received due attention, twenty-five years of complete preoccupation with purely morphological study of malignant cells could have been avoided and attention directed long ago to the more fruitful search for a chemical stimulus. The National Cancer Institute is making possible a more intensive study of this field by grants-in-aid to state bureaus of industrial hygiene. A recent communication[1] notes the relation of beta napthylamine and benzidine to cancer of the bladder, the increased incidence of lung cancer in workers in the chromate industries, and a suggested increase in workers exposed to asbestos, the evidence suggesting that estrogens may be a potential factor in breast cancer of pharma-

ceutical workers, and the increasing hazards due to radiation in many industries. Any one of these experiments, which are unintentionally performed in the course of industrial development, might yield valuable clues as to the underlying processes involved.

There is much to be accomplished in cancer control, however, with the knowledge already at our disposal. An important step has been taken along this line in the joint preparation by the N.C.I. and the A.C.S. of a new film on "Breast Self-Examination." Studies made by the National Cancer Institute have shown that this disease (which claims 20,000 victims each year) is strikingly amenable to early treatment. If the condition is diagnosed while still localized, the probability of survival for one year or more is 94 per cent, while, if diagnosis is delayed, the figure drops to 48 per cent. Dr. A. V. Deibert has estimated that if women examined their own breasts once a month, this disease could be greatly minimized.

Here then is a case where the key to control is in the hands of the women themselves. A new film on this subject, first shown at San Francisco last June, is endorsed by all the leading authorities in this field. Mutual promotional plans are being developed by the N.C.I. and the A.C.S. to utilize the machinery of the Field Army, the General Federation of Women's Clubs, and other organizations of adult women to further the showing of this film. It is hoped that it can be brought to small communities and rural areas by the 23,000 public health nurses of the country; and every effort will be made to mobilize both official and voluntary nursing agencies in securing their coöperation with this end in view.

1. Mayers, M. R. *Monthly Review*, Division of Industrial Hygiene, New York State Department of Labor 29:13 (Apr.), 1950.

NUTRITIONISTS AND THEIR ORGANIZATIONS

RECENT announcements of the establishment of a certifying board in human nutrition [1] have given rise to the question as to how far such certification will go in separating the sheep from the goats in the ranks of nutritionists. In making a place for themselves in public health, nutritionists have had to create an awareness, in the minds of both their professional colleagues and the public, of the difference between nutritional knowledge and practices based on scientific research and the much more glamorous pronouncements and activities of self-designated experts. They have taught that the best single index of the reliability of nutrition information is to be found in the qualifications of the person responsible for it and that an individual who is affiliated with a reputable professional organization is considered as qualified by a jury of his peers. At the present time, there appear to be in the United States five nutrition organizations in which membership connotes professional standing. What members of these organizations do in a specialized field of public health, and what they say in both their scientific papers and their popular interpretations, deserves consideration if not blind acceptance.

The new *Specialty Board in Human Nutrition* should serve as a "Who's Who" for top-flight research workers in human nutrition, for heads of departments in medical schools and schools of public health, and for highly specialized staff positions in the military and civil branches of government. Other affiliations may have as much or more significance for certain kinds of public health positions.

The *Food and Nutrition Board of the National Research Council* is made up of members "selected by the National Research Council on the basis of demon-

strated leadership in the science of foods and nutrition. They are chosen especially for those qualifications which enable them to interpret the results of food and nutrition research in terms of its broad applications and implications in national and world affairs." [2]

Membership in the *American Institute of Nutrition* connotes standing as a research worker but not necessarily in *human* nutrition.

Membership in the *American Dietetic Association* means a bachelor's or advanced degree from an accredited college or university with basic academic work in foods and nutrition, plus completion of an interneship approved by the Executive Board of the Association.[3]

A nutritionist who is a Fellow of the *American Public Health Association* has been vouched for by the Council of the Food and Nutrition Section as having attained a recognized professional standing in that branch of public health before his application received favorable action by the Governing Council.

Identification with whichever of the above associations stands for leadership in a particular corner of the nutrition field carries with it some assurance of technical competence and professional responsibility. But there are other nutrition organizations with names fully as long and impressive. On investigation some of these high-sounding names have proved to be merely a front for a one-man outfit engaged in propaganda and sales promotion. Some are proponents of raw milk and are otherwise at odds with accepted public health and nutrition teaching, even though their membership may be drawn largely from the medical and dental professions.

What should be the attitude of public health workers toward these organizations of unaccredited status? This is a practical question for administrators reviewing the applications of prospective staff members and for all who try to know something of the information to which the public is exposed through newspapers and magazines, the radio, and television. Those who have attained a certain mellowness in their judgments tend to pass off as unimportant membership in one unaccredited group on the part of an individual who is also associated with an organization of unquestioned repute. There is always the possibility that he is a habitual "joiner" or that he signed up in the hopes of reforming from within. An unknown society may be an exclusive group of specialists which will one day make an important contribution to public health. It is equally likely that it is an aggregation of enthusiasts unhampered by the disciplines of science. If a public health worker stakes his reputation as a nutritionist on identification with an unrecognized association, the burden of proof would seem to rest with him.

1. *A.J.P.H.* Aug., 1950, p. 952.
2. Voris, Le Roy. The Food and Nutrition Board of the National Research Council. *Nutritional Observatory*, 9, 3:43–48 (July), 1948.
3. The American Dietetic Association, Jan., 1950, 20 pp.

Clearing House on Public Health Salary Information and Personnel Needs

The following article on "Fringe Benefits for Public Health Workers," is the second contribution to the "Clearing House" of Franklin B. Caffee, a member of the Subcommittee on Salary Study of A.P.H.A.'s Committee on Professional Education. His first, "Research Tools for Salary Administration," appeared in the March, 1950, JOURNAL.

This represents what it is hoped will be a growing practice for members of the Subcommittee to prepare material for the Clearing House. One or more articles are in preparation for early issues by the Subcommittee's Chairman, William R. Willard, M.D., associate professor of public health, Yale University School of Medicine.

Fringe Benefits for Public Health Workers

THE cost of living declined slightly from September, 1948, to June, 1950.[1] During this period employees sought pensions and insurance (i.e. fringe benefits) rather than wage increases. With the renewal of price inflation following the outbreak of war in Korea, interest has temporarily shifted back to wage and salary increases. If wages and salaries are frozen, effort will again be directed toward obtaining increased fringe benefits, as it was during the wage freeze of 1942–1945. Concessions granted to wage earners by employers are frequently also applied to salaried workers.[2-4] The adoption of liberalized policies by a number of large employers tends to establish a pattern which gradually gains acceptance by employers generally.

Public health administrators will not be able in many cases to raise salaries on short notice. Salaries may perhaps have been frozen by the government before legislative or other authorization for direct salary increases can be obtained. Government salary stabilization authorities might however authorize health agencies to increase expenditures for employees' pensions and insurance, and to liberalize vacation, sick leave, and holiday policies.[5] Moderately increased benefits of this sort might not materially aid recruitment, but should help public health agencies retain present employees.

Fringe benefits are benefits supplemental to employee salaries, rendered at a cost to employers, but not imposed by law.[6, 7] For salaried workers these benefits may be divided into two types:

1. Benefits in the form of reduced employee services such as pay for vacations, sick leave, and holidays.
2. Benefits that involve a direct cash outlay by the employer above the base salary. These benefits include pensions, both contributory and non-contributory; life, accident, disability and hospital, medical, and surgical insurance. There are many other fringe benefit expenses such as overtime, severance pay, employer furnished medical examinations, brief cases, uniforms, generous car mileage allowances, below cost lunches, among others.[8]

THE COST OF FRINGE BENEFITS

A complete fringe benefit "package" includes both large deductions from scheduled yearly hours of work and large cash expenditures. An employer who has gone part way with the trend toward the 35 hour week by cutting the 40 hour week to 37½ hours is hiring

people to work 1,950 hours per year. An employee whose salary is $5,850 per year is thus being paid $3 per hour, $22.50 per day, and $112.50 per week. If this employee is given 4 weeks vacation, 3 weeks sick leave and 10 holidays per year, a total of 9 weeks out of 52 will be paid for but not worked. This is 17.3 per cent of the available 1,950 scheduled work hours per year.

If this employer now seeks, either from choice or from competitive necessity, to give employees a comprehensive pension and insurance package his direct out-of-pocket costs above employee salaries can easily come to from 10 to 20 per cent of the payroll.[9-11] While pension costs are dependent on a variety of factors such as average age of staff, turnover, sex, the interest rate, method of funding and level of benefits, it is safe to assume that a non-contributory pension program will cost 10 per cent of the employee's salary ($585 per year).[12-15] A group life insurance policy will probably cost annually at least $108 per $10,000 policy.[16] Group accidental death and dismemberment will cost about $1.00 per $10,000 policy per month.[16] A group health and accident policy paying up to $50 per week for 26 weeks with an 8 day waiting period for sickness, and including 6 weeks of maternity benefits for female employees, will cost at least $60 a year per employee.[16-18] Group coverage for hospitalization, medical, and surgical expense for an employee and two or more dependents will cost up to $150 per year.[16, 17, 19, 20]

The following total of all these benefits should dispel the idea that fringe benefits are not an important part of the total cost of personal services.

Lost Time Benefits	*Yearly Cost*
4 weeks paid vacation	$ 450.00
3 weeks paid sick leave	337.50
10 holidays with pay	225.00
Total	$1,012.50
Direct Cash Benefits	
Non-contributory pension, 10 per cent of annual salary	$585.00
Group life insurance, $10,000 policy at $9.00 per month	108.00
Group accidental death and dismemberment, $10,000 policy at $1.00 per month	12.00
Group accident and sickness, $50 per week for 26 weeks at $5.00 per month	60.00
Group hospital, medical and surgical policy for employee and family at $12.50 per month	150.00
Total	$915.00
Total Cost	$1,927.50

The total cash cost of the $5,850 per year employee is thus $6,765. He works a minimum of 43 weeks which at $112.50 per week totals $4,837.50. The employer pays 39.8 per cent more than this cost in fringe benefits.

CHOOSING FRINGE BENEFITS: I—LOST TIME BENEFITS

The public health administrator who desires to liberalize his employment policy by a moderate increase in fringe benefits will wish to examine each proposal separately. Each organization will

differ and so each employer will need to work out for himself the fringe package which is the most advantageous to the employees and to the agency.

Vacations: Paid vacations have now become almost universal. While two weeks with pay is the most common practice in industry, professional workers expect to get four weeks.[21-23] The health administrator may feel that the total yearly output of professional and technical personnel will be as great or greater when the vacation is lengthened. For clerical personnel, however, less time on the job probably means less work produced, and may necessitate the hiring of extra help. Perhaps an increase in vacation time could be limited to the Christmas period when activity in some types of agencies is at a minimum.

Sick Leave: Sick leave ranges from one week to four weeks per year, with two or three weeks probably the most common. It is the administration of the sick leave provisions that determines actual costs. The employer may hold sick leave to reasonable amounts by clearly stated written sick leave policies, by requiring medical certification, etc. The employees' knowledge that time and leave records are not merely tabulated, but are analyzed by the personnel officer may help to minimize the abuse of sick leave, while at the same time, assuring that adequate leave is available for those needing it. The right to accumulate a reasonable amount of sick leave from year to year will also tend to minimize abuse. Of course, whether or not the yearly output of employees using sick leave is less depends on the nature of the job. Certainly where a substitute worker must be hired there is an added cost. Where an employer is seeking ways to increase fringe benefits he can either formally or administratively convert the privilege of using sick leave as needed into the right of so many days off work per year to be charged to sick leave.[8]

Holidays: The number of holidays granted per year probably is not a crucial recruitment factor.[24] A liberal policy may help to cut down turnover and improve morale. If an agency is dealing with other groups or individuals who are taking a given holiday, output on this date will be small anyway. The administrator may as well add such a day to the holiday schedule.

CHOOSING FRINGE BENEFITS: II—DIRECT CASH BENEFITS

Pensions: Non-contributory pension plans based on an actuarially sound financial plan vary greatly in cost, but it is likely that 10 per cent of payroll may err on the low side.[25-27] While the Federal Old-Age and Survivors Insurance Program is estimated to cost only 7.4 per cent of payrolls, the Railroad Retirement Board's program is estimated to have a level premium cost of 15 per cent of payrolls assuming a 2 per cent interest rate.[28] Since the United States has experienced a long-term tendency for wages and prices to rise, it is wise for an employer to plan for relatively high pensions.[10, 28, 29] Adequate pensions minimize employee resistance to retirement. But price rises and his own increased (or inflated) salary may lower the attractiveness of a pension that today seems handsome.[11] An employer needs to have his pension plan reëxamined by independent actuaries about once every decade.[11] A flexible plan will permit adjustment to changed conditions.

A pension that employees and the community consider adequate, needs to be about 50 per cent of pay just prior to retirement, but for career public health personnel, the premiums paid during their early years at low salaries will not permit such a pension unless premiums during the later years of high earnings are extremely large.[9, 14] A pension of about 50 per cent of the 10 highest years' average salary seems to be pos-

sible in many plans.[9] All the rights which seem desirable to both health agencies and employees, such as vesting, death benefits, disability retirement, etc., tend to raise pension costs.[13] Health people are particularly anxious to foster the mobility of career public health personnel, and some pension plans in use in public health agencies permit transfer of pension rights.[25, 27]

Public health administrators may be able to utilize medical knowledge and skill to develop pension plans that do not force retirement at a fixed chronological age.[30, 31] The higher the average age of retirement, the lower the cost of pensions, and the lower the age at retirement (such as retirement at 55 or 60 and disability retirement), the higher the cost. Public health workers who still have a contribution to make beyond their 65th year are not standing in the way of younger men. There is a shortage of public health workers. The demand for public health services is limited only by the shortage of funds, not by a point of market saturation.

Many health agencies will become eligible to participate in the Federal Old-Age and Survivors Insurance Program on January 1, 1951.[32] This program is contributory and will tax both employer and employee at the rate of 1½ per cent of earnings up to $3,600 per year. By 1969, the tax will have risen gradually to 3¼ per cent of earnings up to $3,600 per year. Therefore, in agencies electing to participate, at least part of the pension costs may be borne by the employee. The employer will have to provide a supplementary pension for those earning above $3,600 per year, and for some others for whom the federal benefits alone would be inadequate.

Pension costs to the agency may be held down either by omitting some of the costly features such as death benefits and vesting or by having the employee bear part of the cost, or both; but in the period ahead it is likely that the health administrator will want to liberalize his pension plan and will simply need to be sure that he acts only after obtaining competent actuarial consultation.[11, 14]

Group Life Insurance: The advantage of such policies is the low rates obtainable compared to rates for individuals. The total group life insurance coverage for one employee is commonly from one to two years' salary.[16] As with all group insurance policies, if the employer pays the full premium he can easily extend coverage to all employees in the group. If the cost is shared with employees, it may be necessary to make coverage elective. In this case some persons who most need coverage may fail to participate.

Group Accidental Death and Dismemberment Insurance: The coverage for this protection is frequently for the same amount as the group life insurance policy. For an agency with limited funds, this insurance is a very inexpensive way to bid for employee loyalty.[16]

Group Accident and Sickness Insurance (i.e., disability insurance): The greater the proportion of women workers in a group the greater the cost of this coverage will be.[18] Of course, where an employee has 4 weeks of vacation and 3 weeks of sick leave he may not feel a strong need for this protection. This may be especially true if he is protected with a group hospitalization, medical, and surgical policy.

Group Hospitalization, Medical, and Surgical Insurance: Some employers who pay all the premiums for this protection for all employees and their families feel that it is a good investment. Some group plans require that the employee and employer share the cost equally.[33] If the employer pays all the premium cost he can protect all his employees without having to pressure anybody to join just to enroll a large enough percentage of employees to qualify for

participation. For this insurance it is essential that the employer pay as much of the cost as possible, particularly for lower salaried employees, since otherwise, regardless of the attractiveness of the benefits, many low income families will feel unable to participate.

CONCLUSIONS

The field of fringe benefits is truly wide.[8, 17, 34] Except in the field of pensions there are few principles to follow. The salary agreement is more or less controlled by traditional usage in each field. But changing conditions may change the customary or traditional terms of employment in a profession or industry. If the recently announced rise in income taxes is not offset by some fringe benefits for public health nurses, they may go to work for an industrial plant where they will get frequent cost of living raises of $10 per month as prices rise.[2, 4, 35] A nursing agency director might have to arrange some sort of upward adjustments for such nurses or close the agency. She could at that point reëxamine the car mileage allowance and cease asking her nurses to subsidize the agency's transportation.

This discussion has assumed that the military program will intensify the shortage of professional public health workers, that prices will rise, and that employee incomes will have to rise either directly or through supplemental benefits. Administrators in health agencies are subject to the same managerial necessities as other employers.

When a commodity or service becomes high priced, less of it must be used in the production of the organization's goods or services. In a time of labor scarcity, wartime or others, it is particularly desirable that health administrators review operations to see what economies in the use of high priced personal services can be made. Thus where the purchase of a dictating machine or an electric calculator may not have seemed justified in 1940 when clerks were paid $1,200 or less per year it may be a good investment when clerks cost $2,880 in salary and $500 or more in fringe benefits annually. Cost for personal services may sometimes be less if consultants or occupational specialists are hired on a fee basis only as needed for specific jobs, such as writing radio scripts or doing special machine tabulation jobs.

Some tired agency executives who have wearied of the never ending struggle for adequate appropriations or budgets may ask, "Is there no end to employee services and benefits that raise our operating costs?" The answer is "no." The American standard of living will go up and up, with only temporary interruptions.[36, 37, 38] The only place the employee can look for these continuous increases in his material well-being is his job. His employer, in cooperation with his government, is now customarily expected to assume all or part of the costs of the social insurances, as well as to provide such benefits as sick leave, recreational facilities, etc.[34] It is the job of the vigorous health administrator to change with the times and to meet the expectations of employees in these non-wage matters. Indeed, he has little choice. In a partially mobilized full-employment economy, he must keep in step or he will fail to hold his organization together. Thus, granting fringe benefits is a necessity for the health agency, since without them, personnel cannot be retained to render the services which are the agency's reason for existence.

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Credit Lines

THE WORLD FOOD SITUATION

Though man may not live by bread alone, he certainly does not live without bread. And currently a large part of the world is spending its major energies keeping the wolf of starvation from the door. Which gives point to the announcement of new information material recently made by the Food and Agriculture organization of the United Nations.

In March, FAO began the publication in English, French, and Spanish of a bi-monthly *World Fisheries Abstracts*. This is made up of abstracts of technical articles from periodicals, laboratory reports, government bulletins, and other sources from many countries, 25 in the first issue. Annual subscription, $4. Single copies 75¢.

A monograph on *Refrigeration and Freezing of Foods* is the summary of a technical meeting on this subject held in Europe late in 1948. Teaching Better Nutrition, by Jean Retchie, is a study of approaches and techniques prepared in answer to a variety of requests for information on nutrition education in many countries.

FAO also calls attention to two publications of other agencies: *Changes in World Consumption of Calories* and *Proteins Over the Last Decade*, published in and reprinted from the *Milbank Memorial Fund Quarterly* (28, 2 (Apr.), 1950). It concludes that the average net available per capita world supply of these foods decreased in the decade 1938–1948 and that maldistribution became more acute during the same period.

FAO also mentions a reprint from *Nutrition Reviews* (7, 11 (Nov.), 1949) on Nutrition on the International Level: The Nutrition Division of FAO, which outlines FAO's organization and aims with specific reference to the Nutrition Division. Both of the latter articles are by staff members of the Nutrition Division.

A browsing among these documents should be required of all public health workers who are, or if they are not should be, sensitive to the relation both between food and health problems and also between food and the larger ideological problems of the day.

SICKNESS: CAUSE OR EFFECT

For anyone interested in the problems either of preventive medical care or of the interrelation of medical care and other social problems, there is food for thought in a recent survey of dependency in New York State. Among its findings are that, as of November, 1949, three out of every ten families were dependent because the wage earner was ill or handicapped; the average case of sickness and disability remains on relief a year and a half as compared with the average of a year for all cases; in 1948, 42 cents of each relief dollar was spent for medical care and hospital costs, an increase from 25 cents in 1942; one out of every three adults received medical or hospital care or both. This ought to be a telling argument for the proverbial "stitch in time." New York State Department of Social Welfare, Albany.

INDIANA'S BULLETIN IN A NEW DRESS

The Indiana State Health Department celebrated the opening of its new building (*A.J.P.H.*, June, 1950, p. 1054) by putting its monthly bulletin into a colorful new dress. The July dedication issue is in handsome shades of blue and gold with a photographic and textual story of the State Health Department services and a running history of public

health movements in the state, beginning with 1808, when a Vincennes paper criticised town officials for letting grass grow in the river, vapor rising from which was thought to be responsible for malaria, to 1950 when East Chicago established a full-time health department for its more than 50,000 citizens. There's a long history still to be written since less than a third of the state's people have the services of a local full-time health department. Of its 9 cities with populations of 50,000 or more, 4 are without such services.

THE HANDICAPPED HAVE TWO NEW VOICES

Valor, the official organ of the American Federation of the Physically Handicapped, began publication in June, 1950. Its first issue describes it as "the voice of the physically handicapped," striving to present his viewpoint. It served also, together with the second issue, as a build-up for the 6th annual National Employ the Physically Handicapped Week, October 1–7, and for the 5th biennial convention of the Federation which was held in Washington, D. C., August 28–30. *Valor*, National Press Building, Washington 4, D. C. Annual subscription $2.50, single copies 25¢.

The first issue of *Performance: The Story of the Handicapped* was published in July by the President's Commission on employment of the handicapped. Its purpose is "to bring about a better understanding of the real abilities of the physically impaired." This issue reports that in 10 years the U. S. Employment Service has placed nearly two million physically handicapped persons. In 1940 about 28,000 handicapped persons were placed; by October, 1947, that figure had been reached in one month, and in 1949 placements reached 165,000. The pamphlets include pictures of the only two quadruple amputees of World War II and the story of what they are doing. U. S. Department of Labor, Washington, D. C.

AMA HEALTH EDUCATION PAMPHLETS

The American Medical Association's Bureau of Health Education opens the fall season with a bibliography of its currently available health publications, and a list of new pamphlets published since January, 1950. The pamphlets are largely reprints from *Today's Health (Hygeia)*. They bear such titles as Sitting Pretty which you can guess is on posture, How You can Judge a Restaurant, Cancer of the Lip, Arthritis, So You Can't Sleep, and So You're a Man, for the adolescent boy. They sell for 10¢ or 15¢ with reductions for quantity orders. The list, Publications About Your Health, is presumably free.

A word should also be said about the manner in which the list is being introduced. The sales letter accompanying it suggests problems about which the Bureau of Health Education might have helpful information such as "Perhaps you know a young parent depressed because his offspring of 18 months has not yet begun to make conversation . . . and the neighbor's child of the same age is merrily chatting away," or, "You are probably acquainted with any number of persons who never give much thought to their health until they feel 'just miserable.'"

American Medical Association, Bureau of Health Education, 535 N. Dearborn St., Chicago 10.

U.S.P.H.S. BOOKLETS ON CHRONIC DISEASE

A wide variety of public health workers will wish to be familiar with seven recently issued booklets from the Division of Chronic Disease, U. S. Public Health Service, Washington, D. C., of which A. L. Chapman, M. D., is Medical Director.

These booklets are designed to de-

lineate factually some of the problem areas in the range of chronic disease control for the benefit of leaders in the field of public health. The problems have been presented pictorially wherever possible to assist readers to grasp quickly the fundamental concepts involved. The fact that community programs require wide planning and cooperation is emphasized and the place of state and local health departments in solving these problems is pointed out.

Subjects included are obsesity, multiple screening, medical rehabilitation, home care, conservation of vision, conservation of hearing, and chronic disease.

These booklets represent a useful translation of somewhat abstract ideas into practical application. They deserve the attention of public health workers generally.

USING THE RESOURCES AT HAND

More than one-fifth of West Virginia's workers are miners, traditionally a hazardous occupation. West Virginia is also among the states in the lower brackets of per capita income. But like the moderate income family which adds comforts to its living through ingenuity in making do with what is at hand, the West Virginia Health Department has found a way to provide consultant industrial hygiene service to the state's labor and industry. By an arrangement with the new Pittsburgh School of Public Health, the head of the department of occupational health, A. G. Kammer, M.D., will provide consultant service on problems of industrial medicine and toxicology. Nor is this a one way street for the Pittsburgh School; there should be rich rewards from dealing with industrial hygiene problems in the field as well as in the classroom.

SANITARY REFUSE DISPOSAL

The Erie County (N.Y.) Department of Health believes in sanitary refuse disposal. It is also in favor of utilizing the sanitary fill method. A simple, readable, illustrated 12 page pamphlet explains for the citizens of Erie County just what the sanitary land fill method of refuse disposal is and why it is the preferred method in many situations. J. A. Salvato, Jr., P.E., chief of the Bureau of General Sanitation, is responsible for the preparation of the pamphlet, which he is apparently willing to share with other workers in this field. Erie County Department of Health, 605 City Hall, Buffalo, N. Y.

A MARYLAND COUNTY REPORTS

In July the Health Department of St. Mary's County, Maryland, began issuing a monthly bulletin for citizens of the county, with the aim of keeping "interested citizens informed as to what we are doing or attempting to do, and what our plans for the future are. We will always welcome your suggestions and criticisms." The first issue, which coincides in point of time with the arrival of the new Health Officer, Alan D. Houser, M.D., is a simple mimeograph pamphlet which tells citizens about the nursing and environmental sanitation services of the department as well as some information about some of the communicable diseases.

WORTH ACQUIRING

Industrial Health Legislation: A Compilation of State Laws and Regulations has been prepared by the Public Health Service as an answer to numerous requests received by the Service for information concerning state legislation for the prevention and control of occupational diseases. Among its interesting gleanings is that in all but five states industrial hygiene activities are in the state health department; in two, Massachusetts and New York, they are in the department of labor; and in three, Illinois, New Jersey, and Ohio, they are divided between the two departments. The compilation is mimeographed

and, is generally speaking, readable.

Parents Book is the New York State Health Department's companion piece to its *Baby Book* (*A.J.P.H.* Feb., 1949, p. 240). Done in the same baby blue and pink, its emphasis is upon a relaxed and happy attitude through understanding. Prepared by staff members of the maternal and child health, nursing, and health education bureaus, the text was reviewed, and approved for general public health education by the Council Committee on Public Health and Education and subcommittees on Maternal and Child Welfare of the New York State Medical Society. New York State Department of Health, Albany. No information as to price.

Get acquainted with and call to the attention of your city administrator the new, practical volume *Monthly Administrative Reports for Cities* published by the International City Managers' Association, 1313 East 60th Street, Chicago 37, Ill. Price $2.00. Suggested reports for a city in 32 pages!

ANNUAL REPORTS

"Their Health . . . Our Business" is the 1949 annual report of the Cook County Department of Public Health. In extensive photographs and less text it tells what services the 700,000 citizens of Cook County (not Chicago) get from their health department—services beginning no further away than the water tap in the kitchen sink. Statistics are reduced to one page of easy reading. The dollar bill of the department, which as a matter of fact is only 44 cents per capita, is divided into its components. The three largest items are nursing, 43 cents; medical services, 12 cents; and administration and sanitary engineering, each 10 cents. An interesting idea for portraying services is the back cover showing 20 links in the chain of healthful living. Cook County Department of Public Health, 737 So. Wolcott Ave., Chicago.

"Public Health Accounts" reports on the 1949 happenings of the Corpus Christi-Nueces County Health Department in Texas. It is short and very much to the point. Its chief message on each page is in red, the supporting details in bold black. And it doesn't pull its punches giving such damaging information as the fact that the average span of life in Nueces County is 22 years less than is true for the United States as a whole and that the infant death rate is more than a third higher. Figures are shown separately for Anglo, Latin, and Negro, thus highlighting the fact that the underprivileged citizen is also the least healthy. Isn't there a better objective classification word than Anglo, by the way?

"Communicable Disease Center: 1948–1949 Activities" is the report of the 3rd year of this organizational unit of the Public Health Service "attacking communicable disease problems through teams of specially trained scientists." It is an impressive story of activities and accomplishments. In the organization of the report and in the way activities were carried out, is illustrated "the paramount objective . . . to assist the states in the control of communicable diseases. . . Emphasis is on helping the states to bring their respective communicable disease facilities and personnel up to the level where they can do the job unaided." Communicable Disease Center, Atlanta, Ga.

BOOKS AND REPORTS

All reviews are prepared on invitation. Unsolicited reviews cannot be accepted.

Textbook of Bacteriology—*By J. M. Dougherty and A. J. Lamberti (2nd ed.). St. Louis: Mosby,* 1950. 491 pp. Price, $5.75.

This volume contains 40 chapters and 491 pages dealing with the topics and in the brief manner, usual in many texts for beginning students of diagnostic microbiology. The list of subject headings includes history (18 pages), microscopy (17 pages), yeasts and molds (8 pages), apparatus and methods (11 pages), etc. One of the largest chapters (25 pages) is that on the complement-fixation and flocculation tests, with full technical details, especially of the Kolmer and Kahn tests. Two other large chapters are that on the combined subjects of water, milk, and food (23 pages), and the discussion of parasitic protozoa (32 pages), including 6 pages on diagnostic methods. Three pages are given to the Friedlander group, 4 to the *Pseudomonas* group, 6 to the *Actinomyces,* 8 to the diphtheria bacillus, 10 to the *Neisseria,* and 12 to the colon-typhoid-dysentery group. The pathogenic fungi are discussed in a 23 page chapter. References to literature, largely prior to 1929, accompany each chapter. There are 141 figures, mostly line drawings and diagrams. There are an Introduction by Dr. John A. Kolmer, a table of contents, and an index. The book is well and attractively printed and bound.

MARTIN FROBISHER, JR.

Epidemiology in Country Practice—*By William Norman Pickles (2nd. ed.). Baltimore: Williams & Wilkins,* 1949. 112 pp. Price, $2.50.

This short book gives an account of the observations of a country practitioner on the epidemiologic aspects of communicable diseases occurring in his practice in a sparsely settled rural area in England. Emphasis is given to the advantages of observing diseases under natural conditions, especially under circumstances where the physician is thoroughly familiar with the physical and social environment and where means and routes of spread of communicable diseases are limited.

The author describes in a simple and lucid style his observations on the mode of transmission, incubation period, period of communicability, degree of infectivity, and other epidemiologic characteristics of communicable diseases as they occurred in his district in the period between World War I and World War II.

One chapter is devoted to the author's experience with some of the more common communicable diseases: influenza, measles, scarlet fever, whooping cough, mumps, and lobar pneumonia. Separate chapters are given over to some dysentery and rarer communicable diseases, chickenpox and shingles, epidemic catarrhal jaundice, and epidemic myalgia.

This book will furnish stimulating and delightful reading to medical students, physicians, especially those practising in rural areas, and workers in the field of public health. To epidemiologists as well as many others this book is considered as one of the classics.

KIRK T. MOSLEY

Statistical Vocabulary—*Washingington, D. C.: Inter American Statistical Institute,* 1950. 117 pp. Price, $2.00.

The *Statistical Vocabulary* is a list of approximately 1,800 English statistical terms or phrases with their equiva-

lents in Spanish, French, and Portuguese. The terms selected for inclusion cover various fields of applied statistics as well as the theoretical science of statistics, although the numerous medical and public health words required in vital statistics and epidemiology have not been included.

No attempt is made to give definitions of the terms, but the vocabulary is arranged with indexes so that it may be entered with a word in any of the four languages and the equivalents in the other three languages easily found. For this reason, the vocabulary will be a handy volume to assist users in reading statistical materials in various languages.

However, as is recognized in the preface, the *Vocabulary* has been prepared also for the more fundamental objectives of promoting greater consistency in inter-American statistical usage and to sharpen and make more precise the technical usage of terms.

To be accepted as a standard for these purposes, the four language equivalents must be selected with great care, and it seems that the Inter American Statistical Institute has taken the necessary steps of consulting expert linguistic opinion. There is no doubt but that the volume will be eagerly accepted as a standard and will become an important tool in the improvement of statistical methodology. FORREST E. LINDER

Love is Not Enough. The Treatment of Emotionally Disturbed Children—*By Bruno Bettelheim. Glencoe, Ill.: Free Press,* 1950. 386 pp. Price, $4.50.

This is a very readable account of one method of rehabilitating children who are emotionally disturbed in a severe degree by means of psychoanalytic technic. Since 1944 this school in Chicago has graduated 40 children whose later life appears to be better adjusted, but the author points out that it is still too early to measure the success of the method.

These methods of cure are exceedingly laborious, requiring at least 2 years of highly specialized treatment. The public health worker will be struck with the advantage of prevention which may avoid such costly cure. Public health nurses especially will use the simple day by day technics of helping children with fresh insight when they understand the difficulties of cure.

REGINALD M. ATWATER

Research in Medical Science—*Edited by David E. Green and W. Eugene Knox. New York: Macmillan,* 1950. 492 pp. Price, $6.50.

This interesting volume is one in which thirty-three specialists survey the methods and problems of their particular fields of medical research with the hope of enlightening and inspiring the nonspecialist reader. The topics covered range from bacteriophages, viruses, rickettsial diseases, epidemiology, and the methodology of medical genetics, to immunochemistry, enzyme chemistry, chemotherapy, microörganisms and vitamin research, isotopes in medical research, plasma proteins, differentiation and specialization of biologic media, endocrinology in cancer research, hypertension, pediatrics, the direction of surgical effort, some of the biochemical problems in sanitary engineering, and other topics.

The reviewer has read the book with much interest and profit. Some of the chapters have the thrill of a serial adventure story, especially the section on rheumatic fever. A careful reading of this volume will broaden one's horizon and also offer many suggestions for possible lines of research in his own field. Most of the chapters have ample lists of references. Unfortunately, one misses these in a few cases. The only serious omission seems to be that of a full subject index. The inclusion of such an

index in a later edition would greatly enhance the usefulness of the volume. It is also hoped that future editions will include more of the fields of medical research, including the sex hormones, penicillin, streptomycin, and other subjects.

The editors have succeeded well in their aim to bring home clearly to the reader the type of training and preparation which is needed to carry on medical research today as well as the broad type of fundamental knowledge on which modern medical research rests.

This is a significant volume in the field of medical science, and one which can be heartily recommended to medical students, internes, clinicians and public health workers, as well as to biochemists, physiologists, nutritionists, and other specialists who are engaged in any of the various fields of medical research.

JAMES C. THOMSON

Effective Living—*A Course in Health and Safety Education for Senior High Schools. Tallahassee, Fla.: State Department of Education,* 341 pp.

Recognizing that teachers need "accurate and sound information to guide them in teaching health and safety to high school boys and girls," the Florida State Department of Education provided leadership for the preparation of this excellent guide and utilized the services of many individuals and organizations in determining its contents. Committees of teachers and participants in workshops took an active part in its production.

The guide consists of three sections, (1) Introduction, (2) Resource Units, and (3) Sources of Materials. The introduction develops a point of view concerning health education and its place in the high school curriculum; lists the characteristics, needs, interests, and problems of adolescents; and offers pertinent suggestions relating to teaching methods.

A section devoted to resource units indicates the comprehensive content of a secondary school health course. Under each suggested topic, after a statement of the problem and consideration of ways for studying it, there is an extended list of possible pupil experiences through which understanding of the problem may be gained.

References for both teachers and students, sources of visual aids, and a list of professional and nonofficial organizations which may be of help in planning and conducting a health education program are included in a final section.

Although prepared primarily to assist teachers of health in Florida high schools, this guide has information of interest and value to high school teachers in other states, to those preparing teachers of health, and to community health educators. It is modern, attractive, well organized and comprehensive.

CHARLES C. WILSON

Related Science for the Food Trades—*By Bernard E. Silver. New York: University of the State of New York, State Education Department,* 1949. 163 pp. Price $2.15.

This book is intended to be an instructional aid for teachers who discuss modern methods of food preparation, processing, and preservation. It is designed to demonstrate particularly the interrelationships between food science or art and other sciences, such as chemistry, physics, and microbiology.

The subject material of the book is divided into eight areas: (1) food changes, (2) composition of foods, (3) identification of foods and adulterants by physical methods, (4) liquid foods, (5) role of water in the food industries, (6) food solutions, (7) food spoilage, and (8) food preservation. Each area is investigated by means of from three to six selected topics outlined uniformly with respect to objectives, related tech-

nical information, experimental or demonstration procedures, selected references, and questions.

Teachers in vocational schools, in high schools, and in colleges that do not specialize in food technology should find much of great value in this well organized and carefully written aid. The topics are well chosen and the demonstrations or experiments simple but ideal for the most part to illustrate clearly the predetermined objectives. Certainly, if an instructor is able to convey to his students an understanding of all the fundamental principles described in this book, they will possess a broad background for further detailed study in the field. E. E. LOCKHART

Municipal and Rural Sanitation—*By Victor M. Ehlers and Ernest W. Steel (4th ed.) New York: McGraw-Hill,* 1950. 548 pp. Price, $6.50.

Practically everyone actively engaged in the sanitary engineering and sanitation field is familiar with one or more of the three preceding editions of this widely used book.

The new fourth edition is a very complete coverage of the various fields in environmental sanitation as applied in public health practice. It begins with a brief general introduction on disease prevention, with special reference to sanitation in public health work. The first chapter is on communicable disease control, with emphasis on the diseases affected by environmental factors. This is followed by 24 chapters that cover the field of environmental sanitation. The two concluding chapters are on vital statistics and public health organization, and both are designed to be helpful to those interested in public sanitation.

New material has been added to each chapter of this fourth edition, but as stated by the authors, particularly the sections dealing with excreta disposal, fly and rat control, sanitation of milk and foods, housing, ventilation, and industrial hygiene. Illustrative of other significant new additions is material on sanitation of public conveyances, disaster sanitation, and ragweed control.

The book presents in concise form information which is well adapted to the use of both students and practitioners in sanitary engineering and sanitation and in other related public health fields.

The authors are to be commended for revising and bringing up-to-date this outstanding book on environmental sanitation. HAROLD A. WHITTAKER

Babe in a House—*By Mollie Stevens Smart. New York: Scribner,* 1950. 212 pp. Price, $2.75.

This book was written by the author of *Understanding Your Baby* and co-author of *Its A Wise Parent.* She is the mother of three young daughters, and a psychologist and teacher of child development. This background has helped make it possible for her to write an elementary, humorous easy-to-read, easy-to-follow, but fairly complete and detailed account of the baby, and later the preschool in the family.

She tells the inexperienced mother what to expect when she goes to the hospital; how to prepare for the baby emotionally and materially. She lists a layette in two columns: "Necessities" and "Fun To Have." In much of her discussion she recounts the new and old methods, for instance, of feeding, or of hospital baby care. She always thinks of the baby's problems in relation to the rest of the family, and the family in relation to their social set and community. "Practical satisfactions and difficulties" are stressed. The gradualness of learning and gradualness of change, particularly in the young, are emphasized. Trying to make the mother see things from the child's point of view—how does it feel to be just born and learning to breathe, and being able to view things only in a vague haze. Then

months later after seeing everything from the horizontal position 24 hours a day, how important it must be first to sit up. These devices help make this book of continued interest and practical help to the family group as well as the young mother.

The chapters on relationships with grandparents, procuring and using baby-sitters to best advantage, and the last chapter, the value of happy families in the community, may not be the best, but they are all well done, and these are the most full of empirical knowledge. and the most original.

There is an excellent "List of Recommended Books."

There was need of a book of this nature not written for a professional group, but accurate, and easily readable, with easily read print, on good paper, with excellent photographs, each of which tells its own story. This book has all of this and can be heartily recommended. PAULINE BAND HIRSCH

Biological Foundations of Health Education—*Proceedings of the Eastern States Health Education Conference. New York Academy of Medicine. New York: Columbia University Press,* 1950. 179 pp. Price, $2.50.

This book brings together the contributions of fifteen leaders in the fields of nutrition, psychiatry, gerontology, epidemiology, and sociology, with the stated intent of presenting new concepts which will lead to a "philosophy of positive health education." Each contribution presents extremely interesting items of factual information, but it is difficult to see these as influencing a philosophy.

The advanced strides taken by the authors in their specific fields are a definite challenge for the public health profession not to lag behind with the old trite statements of health instruction. Whether the reader is a health educator or in some other classification, the book presents new directions in the various fields which are thought-provoking and worthy of a try in application. There is a strong emphasis not to pass out as the gospel the ideas and concepts of twenty-five years ago, but to get up to date. It is in emphasizing this point that the volume makes its greatest contribution.

NORMA JOHANNIS

Having a Baby—*By Alan F. Guttmacher (original publisher, Viking Press). New York: The New American Library of World Literature, Inc.*, 1950, 192 pp. Price 25¢.

This little popular priced "Signet Book" is a second revision of Dr. Guttmacher's *Into This Universe: The Story of Human Birth,* first published in 1937, then issued in a revised paper bound edition in 1947 with title shortened to "The Story of Human Birth."

Dr. Guttmacher's long experience as obstetrician in Baltimore, Associate Professor of Obstetrics at Johns Hopkins Medical School, and Chief of Obstetrics at Sinai Hospital in Baltimore, would brand as authoritative any writing he decided to publish.

The present edition, according to the author in his preface, was inspired by the "amazing ignorance about birth" shown by patients, students and others. It is designed to provide "a readable book on pregnancy" which is cheap and readily available.

The book fulfils these requirements and more. It is very inclusive, starting with conception and proceeding through a discussion of all phases of pregnancy, labor, delivery; even to the care and feeding of the new-born infant. While no attempt is made to gloss over dangers and complications, the prospective parent would be encouraged rather than otherwise, since the book is supplied with statistics showing the improvement of obstetrical practice and the diminishing dangers of childbearing. Drawings

to illustrate the implantation and development of the fetus, and interspersed folk lore, combine with an easy-flowing style to enhance the readability.

It is believed that this book will prove especially interesting to public health nurses and medical social workers, and to pregnant college graduates and their mates. These groups will not feel insulted by over-simplification of language; since this is on the whole rather technical. Definitions of the more difficult terms are included in the text.

FLORENCE A. BROWNE

Veterans Administration Technical Bulletins. Series 10. Vol. III—*Washington, D. C.: Veterans Administration,* 1949.

This is the third volume of a series of articles which the Veterans Administration has published and is distributing to its medical staff. As was pointed out in the review of Volume II (*A.J.P.H.* June, 1949, p. 808), brief summary articles covering a number of subjects "have the advantage of permitting more general presentation than is allowed by most journals and of providing more rapid publication than is possible in textbooks."

A previous account of the treatment of Rocky Mountain spotted fever is supplemented with statements of the use of aureomycin and chloromycetin, and excellent summaries are carried of the diagnosis and management of brucellosis by Wesley W. Spink, M.D.; radioisotopes in medicine, George M. Lyon, M.D.; the vitamins and vitamin deficiency diseases by Dwight L. Wilbur, M.D.; the management of syphilis and neurosyphilis by William Leifer, M.D., and collaborators; the whole volume with other clinical reports representing a very valuable contribution.

REGINALD M. ATWATER

The Effects of Atomic Weapons—*Los Alamos Scientific Laboratory, Washington, U. S. Gov. Ptg. Office,* 1950. 456 pp. Price, $1.25.

This is an authentic, semi-technical volume which includes a large amount of factual information about an atomic explosion, such as data on the shocks from air, underwater, and underground bursts. Although the principles of atomic explosions are considered in some detail, greatest emphasis is placed on the results of such explosions. Detailed consideration of thermal radiation and incendiary effects and nuclear radiations is given. There are chapters on measuring radiation, on decontamination, and on the protection of personnel. The volume is well illustrated. It deserves to be widely read and understood by those whose responsibility it would be to care for an atomic disaster.

Much of this information will be dealt with in the Special Session on Public Health in Civil Defense to be featured at the forthcoming meeting of the A.P.H.A. and to be published in this *Journal.*

F. B. ELDER

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Evaluation Is Still Underway—You owe it to yourself to read this measured discussion of the cons and pros of tuberculosis vaccination (which haven't changed much recently). Whatever reliance is placed on immunization there must be no relaxation of the accepted control measures, the writers warn.

ANDERSON, R. J., AND PALMER, C. E. BCG *J.A.M.A.* 143, 12:1048 (July 22), 1950.

Required Reading—"In the face of imminent danger, the most futile policy men can adopt is to sit idly by and hope that it may never materialize." How much longer can public health avert its eyes from the hideously neglected need for realistic disaster relief? The British public health fraternity was alerted by Wedd, D. G. in "Some Medical Aspects of Atomic Warfare." *Public Health* 63, 9:170 (June), 1950.

BRADFORD, C. H. Medical Aspects of Civilian Defense. *New England J. Med.* 243, 5:182 (Aug. 3), 1950.

With Commendable Caution — How the New York State Health Department has gone about its attack upon alcoholism is a story worth knowing. It began in a limited way in Buffalo. The other papers in this symposium are recommended, too.

BRIGHTMAN, I. J. Chronic Alcoholism as a Public Health Responsibility. *New York State J. Med.* 50, 14:1702 (July 15), 1950.

Too Much Trouble?—Sixteen million people enter hospitals every year. They enjoy a higher incidence of tuberculosis than do people generally. However, most of them are not x-rayed on admission, so a whopping group of tuberculous people are missed. Has local health administration a contribution to make?

BRYANT, Z. Tuberculosis Case Finding in General Hospitals. *Pub. Health Rep.* 65, 22: 710 (June 2), 1950.

With No If's, And's, or But's—Evidence is now sufficiently conclusive to recommend that all public water supplies deficient in fluorides should have their fluoride content increased to approximately 1 p.p.m. immediately. You will, of course, read this whole paper before you accept or reject this conclusion.

BULL, F. A. Control of Dental Caries by the Addition of Fluorides to Public Water Supplies. *J. Am. Dent. A.* 41, 2:146 (Aug.), 1950.

Another Voice in Wilderness—Public health carries a responsibility for mental health. By participating as educators in staff-orientation programs, psychiatrists can contribute most to the new epidemiologic approach to community mental hygiene.

COLEMAN, J. V. Psychiatric Service in Relation to Public-Health Activities. *Ment. Hyg.* 34, 3:364 (July), 1950.

"We Rarely Think of Health Till We Lose It."—Mostly because it gives an early opportunity to call your attention again to my favorite health periodical — *Health Education Journal* (Br.)—the ancient comment on human nature quoted here is selected from among a wealth of evocative and challenging ideas presented by a galaxy of writers (including our own Clair Turner and Janet Mackie).

DAVIES, T. A. L. Some Thoughts on Health Education. *Health Ed. J.* 8, 3:103 (July), 1950.

Polio and Injections—It seems some British researchers have been concerned about the alleged relationship between diphtheria toxoid injections and the site of poliomyelitis attack (when one follows within a month of the other). If you hunt out this report of a statistical study, don't fail to read a biting commentary on the whole controversy by Bousefield entitled "The Surrender to Poliomyelitis" in *The Medical Officer* of July 15 (84, 3:29).

HILL, A. B., AND KNOWELDEN, J. Inoculation and Poliomyelitis. *Brit. M. J.* 4669:2 (July 1), 1950.

From the Brotherly-Love City—Ten years' experience with small-scale tuberculosis patient rehabilitation convinces these surveyors that it is a wise and humane service which should be, as it is being, expanded.

LANGTON, G. K., *et al.* Rehabilitation of the Tuberculous in Philadelphia. *Am. Rev. Tuberc.* 62, 2:190 (Aug.), 1950.

Re "Optimistic Promises of Propaganda"—This epidemiologist has been insisting all along that there is no supportive statistical evidence to indicate that "cancer control" controls cancer in Canada. Now he drags in Massachusetts and British reports to bolster his belief that Canada is not unique in this respect. It's high time someone answered this man, or else—.

MCKINNON, N. E. Cancer Mortality Trends in Different Countries. *Canad. J. Pub. Health* 41, 6:230 (June), 1950.

City Youngsters' Health—Children living in metropolitan areas are assumed to be especially blessed in the matter of health services and facilities. This survey of twelve districts indicates that all youngsters are not uniformly privileged. New York (including Northeast New Jersey) makes the best general showing.

PENNELL, M. Y., *et al.* Child Health Services in Twelve Metropolitan Districts. *Pub. Health Rep.* 65, 29:903 (July 21), 1950.

Long, Broad, and Deep—You may rightfully call the first half of our century the age of the child. Without neglecting the youngsters, let's make the second half the age of the aged, suggests this philosopher.

MOUNTIN, J. W. Public Health and Aging. *Pub. Health Rep.* 65, 25:795 (June 23), 1950.

Doubting Thomases: Please Note—Reported here is still another well controlled demonstration that the common cold virus can be propagated on chick embryos. Two of each three volunteers in whose noses the material was instilled came down with typical colds.

WARD, T. G., AND PROCTOR, D. F. Isolation of a Common Cold Virus in Chick Embryos and the Clinical Manifestations It Produces in Human Volunteers. *Am. J. Hyg.* 52, 1:91 (July), 1950.

Keeping Light in Circulation—Both peach and coral tints seem just a little fancy for health department office walls, but they are only two of six time-tested color schemes that make for better working conditions. Glare, too, is a matter about which you could well give some thought.

STALEY, K. A. Lighting and Color. Aids to Good Seeing. *Modern San.* 2, 8:24 (Aug.), 1950.

He Saw Much of It Happen—History brought alive! That, I think, epitomizes this scholarly annual address given before the Society of American Bacteriologists. It ends with these words: "You have behind you the heritage of a half-century of brilliant progress. You have before you a limitless horizon for the future."

WINSLOW, C.-E. A. Some Leaders and Landmarks in the History of Microbiology. *Bact. Rev.* 14, 2:99 (June), 1950.

BOOKS RECEIVED

Listing in this column acknowledges the receipt of books and our appreciation to the senders. Space and the interests of readers will permit review of some, but not all, of the books listed.

APHORISMS. Sir William Osler. Collected by Robert Bennett Bean, Edited by William Bennett Bean. New York: Henry Schuman, 1950. 148 pp. Price, $2.50.

ATOMIC ATTACK—A MANUAL FOR SURVIVAL. John L. Balderston, Jr., and Gordon W. Hewes. Culver City, Calif: Murray & Gee, 1950. 55 pp. Price, $1.00.

CALORIE REQUIREMENTS. Report of the Committee on Calorie Requirements. Food and Agriculture Organization of the United Nations. New York: Columbia University Press, 1950. 65 pp. Price, $.75.

CEREBRAL PALSY. John F. Pohl. St. Paul, Minn.: Bruce Publishing, 1950. 213 pp. Price, $5.00.

CEREBRAL PALSY EQUIPMENT. Chicago, Ill.: National Society for Crippled Children and Adults, 1950. 268 pp. Price, $3.75.

CHALLENGE OF CANCER. Lester Grant. Washington, D. C.: Supt. of Documents, 1950. 116 pp. Price, $.55.

CONTROL OF RADIATION HAZARDS IN THE ATOMIC ENERGY PROGRAM. Washington: U. S. Atomic Energy Commission, 1950. 230 pp. Price, $.55.

EFFECTS OF ATOMIC WEAPONS. U. S. Department of Defense and the U. S. Atomic Energy Commission. (rev. ed.) Washington: U. S. Gov. Ptg. Office, 1950. 438 pp. Price, $1.25.

FINANCIAL STATUS AND NEEDS FOR MEDICAL SCHOOLS. Committee on Medical School Grants and Finances. Washington: Public Health Service, 1950. 89 pp.

FREUD. Dictionary of Psychoanalysis. Nandor Fodor and Frank Gaynor. New York: Philosophical Library, 1950. 208 pp. Price, $3.75.

HEALTH SERVICES. International Ladies' Garment Workers Union. New York: ILGWU, 1950. unpaged.

IMMORTAL MAGYAR. Semmelweis, Conqueror of Childbed Fever. Frank G. Slaughter. New York: Henry Schuman, 1950. 206 pp. Price, $3.50.

INTER-ALLIED CONFERENCES ON WAR MEDICINE. Convened by the Royal Society of Medicine, 1942–1945. Edited by Major-General Sir Henry Letheby Tidy, New York: Staples Press, 1950. 524 pp. Price, $5.00.

MATERNITY SERVICE UNDER THE HEALTH INSURANCE PLAN OF GREATER NEW YORK. George Baehr and Neva R. Deardorff. New York: H.I.P., 1950. 22 pp.

MICROBIOLOGY WITH APPLICATIONS TO NURSING. Catherine Jones Witton. New York: McGraw-Hill, 1950. 660 pp. Price, $4.50.

MONTHLY ADMINISTRATIVE REPORTS FOR CITIES. Chicago: The International City Managers' Assn., 1950. 32 pp. Price, $2.00.

NATIONAL FORMULARY (9th ed.). Washington: American Pharmaceutical Assn., 1950. 918 pp. Price, $8.00.

NURSING IN PREVENTION AND CONTROL OF TUBERCULOSIS. H. W. Hetherington and Fannie W. Eshleman. New York: Putnam's, 1950. 356 pp. Price, $4.50.

PLANNING THE HOME FOR OCCUPANCY. American Public Health Association, Committee on the Hygiene of Housing. Chicago: Public Administration Service, 1950. 58 pp. Price, $2.50.

PNEUMOCONIOSIS. Edited by Arthur J. Vorwald. New York: Hoeber, 1950. 646 pp. Price, $7.50.

PRINCIPLES OF PUBLIC HEALTH ADMINISTRATION. John J. Hanlon. St. Louis: Mosby, 1950. 493 pp. Price, $6.00.

PROFESSIONAL ADJUSTMENTS. Sister Mary Isidore Lennon. (2nd ed.). St. Louis: Mosby, 1950. 354 pp. Price, $3.50.

SCIENTIFIC PRINCIPLES IN NURSING. M. Esther McClain. St. Louis: Mosby, 1950. 353 pp. Price, $3.00.

SYMPOSIUM ON REHABILITATION OF ALCOHOLICS, Dec. 6, 1949. Division of Alcohol Studies and Rehabilitation, Department of Health, Richmond, Va. Richmond: State Department of Health, 1950. 77 pp.

TRACK AND FIELD ATHLETICS. George T. Bresnahan and W. W. Tuttle. (3rd ed.). St. Louis: Mosby, 1950. 490 pp. Price, $5.00.

TRUTH ABOUT YOUR EYES. Derrick Vail. New York: Farrar, Straus and Co., 1950. 173 pp. Price, $2.50.

Motion Picture Film Reviews

Best Food in Town—Food handling and restaurant sanitation. Produced for Texas State Department of Health. Color. Sound. 15 minutes. 16 mm. Available for purchase from Jamieson Film Company, 3825 Bryan St., Dallas, Tex., for $125, F.O.B. Dallas. For free loan only in the State of Texas.

By taking the customer behind the scenes in restaurant operation, this film points out the simple truth that good food must be clean, safe food as well as tasty. From the viewpoint of the sanitarian or health official the film does a straightforward job of showing the ways of preventing food contamination by careful handling.

The technique of demonstration is followed, first, by taking the audience into a small, dirty establishment where all is amiss . . . and then transferring the scene to a clean, well run eating place. Here the film runs into what might be called a slight psychological error. By pointing to mistakes in a small shop and then using a large, well appointed place for the correct side of the picture, the film has a tendency to imply that size and expensive equipment are essential to sanitary operation. As many small restaurant owners are prone to think that the appearance of a health inspector is going to cost them money, it is perhaps not wise to leave the tiny place still in filth while the audience is scooted along to bigger and more elaborate pastures for better food. Few small restaurants can afford the machinery for automatic dishwashing, etc., and therefore this film has only partial value for them.

Plenty of good examples are demonstrated for both the eating and preparation parts of a restaurant. The black smudge trick is used to show how germs travel from unclean hands to a customer's mouth. Proper refrigeration is emphasized, and this is carried to the extent of giving a tip to the chef that his meat grinder head might be kept in the refrigerator between operations to reduce the rate of bacteria growth. The correct way to handle knives, forks, glasses, etc., is carefully considered.

A good tip is handed the audience when the film suggests that a sloppy looking dining room and poorly trained help nearly always indicate unhealthy conditions in the kitchen.

The film is perhaps best suited for restaurant owners and operators. The theme of satisfied customers adding up to good business is the main trend. For restaurant workers the film is not quite detailed enough to be labeled a complete training vehicle. The lay public would get a sound impression of the importance of cleanliness, but would probably feel that sanitation is not its problem. For the most part, the average customer does not possess the critical eye needed to discern the subtle pitfalls of poor restaurant management.

The narration is good and the photography, while not always in uniform color brightness, is sufficient for the purpose. The production definitely marks a step in the right direction toward making educational material of this nature less drab and uninteresting.

MILTON KOSSACK
AB. JACKSON
ROBERT WILLARD

Safe Service—Sanitary handling and storage of single-service paper cups and containers. Black and white. Sound. 15 minutes. 16 mm. Produced for Health Officers News Digest by the Institute of Visual Training, 40 East 49th Street, New York 19, N. Y.

This film is noteworthy. Its inclusion in any retail food handler training

course practically guarantees a solid 15 minute success spot for the program. It stimulates audience participation and its background of humor and lightness makes its important sanitation message palatable and attractive.

The film arouses interest at once with a clever surprise introduction and retains the audience's attention while the story unfolds smoothly and rapidly. Notwithstanding the fast-moving quality of the film, sanitary food handling principles are shown clearly and simply in the form of single ideas. These ideas hit home and are made to stick without any apparent effort but with much forethought and planning under the professional direction of a good cast who act their parts with intelligence and sincerity.

This film contains many suggestions contributed by health department experts, acknowledgment of which is duly made in the introduction. The principles of sanitation in relation to single-service paper containers take up the major part of the film. It should be widely used as a supplement to other available teaching material for a well rounded out program for the retail food handlers.

The sound track is clear and flawless.

JEROME TRICHTER

Breast Self Examination—Cancer. Produced for the American Cancer Society. Color. Sound. 15 minutes. 16 mm. For free loan from state cancer societies and state health departments. Also from local depots of Association Films. For purchase, consult American Cancer Society, 47 Beaver Street, New York 4, N. Y.

The purpose of this film is to encourage and facilitate early diagnosis of breast cancer. The opening scene, showing a physician ending a speech on breast cancer before a typical women's club meeting, is effective. Questions from the audience provide the physician with opportunities to tell how women may aid in early diagnosis through self examination. Stimulated by the meeting, a member of the club goes to her own physician and is taught by demonstration and explanation how to examine her breasts. The concluding scenes show how the woman carries out self examination in her home.

The subject is handled very well. The information is presented sensibly and clearly. The film should be an excellent educational tool for appropriate lay audiences, as well as for teaching nurses and physicians how to teach patients. Self examination of the breasts once monthly after the menstrual period is advised. A simple method of thorough inspection and palpation is demonstrated. The material is presented in a manner to avoid generating cancerphobia. It emphasizes that not all breast lumps are carcinoma and that early recourse to the diagnostic skill of a physician is the sensible and logical attitude to take when a breast abnormality is discovered.

The photography is excellent and in effective color. The actors present this difficult subject in an esthetic and acceptable manner. An illustrated brochure gives a synopsis of the picture and instructions for showing the film. To encourage women to believe that the medical profession supports the concept of the film, it should be shown with the active coöperation of the local medical society. In the words of the booklet, "The one most helpful thing will be the participation of a doctor."

The film is ideally suited for adult women's organizations such as clubs, parent-teacher associations, church groups, social organizations, and similar groups. It is not intended for high school students.

GEORGE M. WHEATLEY

And Then There Were Four—Traffic safety. Produced for Socony-Vacuum Oil Company, Inc. Black and white. Sound. 25 minutes. 16 mm. Distributed by Modern Talking Picture Service, Inc., 45 Rockefeller Plaza, New York 20, N. Y.

Free, except for transportation charges. Not for sale.

In a friendly and intimate manner the well known screen actor, James Stewart, introduces the audience to five normal households in a suburban area. One member of each household is seen leaving by automobile for the day's activities. The narrator points out that the drivers are just ordinary folk, that they are not reckless drivers, but that they do commit some so-called "minor" traffic violations. These are depicted on the screen in an accurate and impressive manner. In addition to having good educational value, the film holds attention through an element of suspense injected by narrator Stewart. He comments that only four of the five drivers will return alive.

Throughout the film emphasis is placed on the so-called "minor" violations, any one of which the audience can readily see might have resulted in a serious or fatal accident. The element of suspense is maintained until the last scene when one of the drivers is killed.

The picture is admirably suited for adult and teen-age driver audiences. It is particularly adaptable to senior high schools and colleges, and for use in driver-training programs. It is of high technical quality. The acting, photography, and sound track are excellent. "And Then There Were Four" should accomplish much in encouraging the average driver to give greater attention to his driving habits.

W. GRAHAM COLE

RECENT MOTION PICTURE RELEASES

(All 16 mm., black and white, with sound, unless indicated otherwise.)

Challenge—Science Against Cancer. The story of cancer research told with a view of drawing young scientists to this field. 30 minutes. Produced for the Department of National Health and Welfare of Canada and the National Cancer Institute of the U.S.P.H.S. by the National Film Board of Canada and the Medical Film Institute of the Association of American Medical Colleges. Also available as a film strip. For purchase from Medical Film Institute, 2 East 103rd Street, New York 29, N. Y. Companion-booklet and teaching guide distributed by Government Printing Office, Washington 25, D. C. For rentals, consult local film-rental agencies.

Fight Against Communicable Diseases. Depicts the work of the Communicable Disease Center of the U.S.P.H.S. 18 minutes. Color. Produced by the Center, and obtainable for free loan. Address: Communicable Disease Center, Atlanta, Ga.

Planned Parenthood Story, A. Interprets the planned parenthood program by the documentary method, with real people in a Tucson, Ariz., clinic. Produced by Simon and Julia Singer; edited and narration added by Planned Parenthood Federation of America, 501 Madison Avenue, New York 22, N. Y., from whom it can be purchased. Runs 18 minutes.

Palmour Street—A Study of Family Life. Child development. Produced for Georgia State Department of Health. Runs 27 minutes. For purchase—Health Publications Institute Inc., 216 North Dawson Street, Raleigh, N. C. No loans.

THE 78TH ANNUAL MEETING

St. Louis, Mo., Oct. 30–Nov. 3, 1950

Hotel Reservation Form

The hotels listed below have rooms available for Association delegates at the rates indicated Please note that NO RESERVATIONS WILL BE ACCEPTED DIRECTLY BY HOTELS. Make your reservations through: *HOTELS CONVENTION RESERVATION BUREAU, A.P.H.A., Room 406, 911 Locust St., St. Louis 1, Mo.*

Hotel	*Single Rooms*	*Double Rooms*		*2 Room Suites*
		Double Bed	*Twin Beds*	*Parlor & Bedroom*
American	$2.75–$4.00	$3.50–$5.00	$4.00–$5.00	$8.00
Baltimore	2.75– 3.50	3.75– 4.50	4.00– 5.00	
Broadview	3.00– 6.00	4.50– 7.00	6.00– 8.00	12.00 18.00
Chase	4.00– 8.00	6.00– 8.00	6.00–10.00	10.00–35.00
Claridge	3.25– 4.75	5.00– 7.50	5.50– 7.50	12.00 & up
Congress	4.50– 6.00	6.50– 8.00	6.50– 8.00	12.00 15.00
De Soto	3.50– 5.00	5.50– 8.00	7.00–13.00	12.00 20.00
Forest Park	3.50– 5.00	5.00– 7.00	6.50 & up	10.00 & up
Gatesworth	4.00 & up	5.00 & up	5.00 & up	10.00 & up
Jefferson	4.50– 6.50	6.00– 8.00	7.50– 8.50	12.00 22.50
Kingsway	3.00– 4.00	4.50– 7.00	6.50– 7.00	
Lennox	3.75– 6.00	5.25– 8.00	6.50– 8.00	11.00 & up
Majestic	3.00– 5.00	4.00– 6.00	6.00– 8.00	
Mark Twain	3.25– 5.00	5.00– 7.00	6.50– 7.00	
Mayfair	3.50– 8.50	7.00–10.00	8.00–10.00	12.00–20.00
Melbourne	4.00– 6.00	5.00– 7.50	6.50– 8.00	12.00 & up
Park Plaza	5.00– 9.00	6.00–10.00	7.35–11.00	9.00–30.00
Roosevelt	3.50– 5.00	5.25– 8.50	7.50–12.00	16.50–19.50
Sheraton	4.00– 6.00	3.80– 5.00	6.00	
Statler	3.75– 6.50	4.50– 5.00	5.50– 7.00	
Warwick	2.75– 3.25	5.00– 9.50	7.00 & up	14.00 & up
York	3.00– 4.00	6.00– 8.00	7.00– 9.00	12.00–17.00

Single Rooms are limited; share a twin bedded room with a fellow delegate. Be sure to use the form below giving the Hotels Convention Reservation Bureau the complete information asked for. This will eliminate unnecessary correspondence for you and the Bureau

Hotels Convention Reservation Bureau, A.P.H.A.
Room 406 — 911 Locust St.,
St. Louis 1, Mo.

Please make hotel reservation as indicated below:

First Choice ..... Second Choice ..... Third Choice .....
(Be sure to give three choices of hotels)
Single Room ..... Double Bedroom ..... Twin Bedded Room .....
2 Room Suite ..... Other Type Room .....
Rate from: $..... to $.....
The name(s) of the occupant(s) of the room will be: .....
.....
.....
Arrival at Hotel ..... hour ..... A.M. ..... P.M. .....
(date)
Departure ..... hour ..... A.M. ..... P.M. .....
(date)

PLEASE NOTE: Hotel accommodations will be held until 6:00 p.m.; later if deposit is made with notification.

Name .....
(Individual Requesting Reservation(s))
Address .....
City and State .....

If the hotels of your choice are unable to accept your reservation the Hotels Convention Reservation Bureau will make as good a reservation as possible elsewhere providing that all hotel rooms available have not already been taken.

ASSOCIATION NEWS

SEVENTY-EIGHTH ANNUAL MEETING
AMERICAN PUBLIC HEALTH ASSOCIATION
ST. LOUIS, MO., OCTOBER 30–NOVEMBER 3, 1950

THE HEALTH EDUCATION CENTER AT THE ST. LOUIS ANNUAL MEETING

Ever since Mary and Evart Routzahn contributed the first collection of scrapbooks in 1924, the Health Education Center has been a familiar feature of the Annual Meeting. It has grown from a personal project of the Routzahns, financed by the Russell Sage Foundation, to an activity of the entire American Public Health Association, sponsored jointly by the Association and the National Publicity Council, involving at least six months of preparation and the active participation of hundreds of health workers throughout the country. From a modest collection of scrapbooks prepared first by the Routzahns, later by the Publicity Council, it has become this year's array of twelve separate collections, created by as many of the Association Sections and housed in one of Kiel Auditorium's large meeting rooms.

Approximately two hundred new portfolios featuring materials and special projects from all the states and U. S. possessions will be offered in St. Louis. Available for distribution will be bibliographies and source lists not only on health education subjects but also on many topics under discussion in the program. Receptionists will be on hand to guide visitors to materials and to arrange appointments with consultants. Each of the Sections will offer a daily consultation service. Experts on media, on health education techniques, and on the specialized fields of public health corresponding to the thirteen Association Sections will be available as consultants.

Since the Center this year is a project of all the Sections, involving coöperative planning and preparation, some of the most interesting scrapbooks will tell the story of community projects in which the health educator, the nutritionist, the sanitarian, the public health nurse, and other public health personnel have all worked together to achieve a common goal.

The unprecedented participation of twelve Sections in the preparation of the Center has produced a wider, more thorough, and certainly more authoritative coverage of the many fields in which health education operates. Only a few portfolio themes are listed below, but they will serve to indicate something of the range of subject matter to be covered: projects in industrial health education, some encompassing not just the worker but the entire industrial community; community premature care programs; materials and techniques used by the public health nurse in work with the aged; patient education of children in hospitals and convalescent homes; health education in medical care programs; school health council[illegible]logical health; health education in rural areas; the use of statistical materials in health education campaigns; projects in community organization (one of the most interesting dealing with migratory workers in California).

Perhaps more important than these results, however, were certain products of the actual process of preparing the Center through the coöperative action of

the Sections and the National Publicity Council. For one thing, not only professional health educators and publicity experts, but thousands of other health workers all over the country were asked to examine critically their role in health education in order to contribute to the Center. Secondly, public health personnel in twelve different fields were induced to sit down together and work collectively on health education. This happened not only in the case of Section officers and their appointed representatives who were directly responsible for the preparation of the Center but everywhere in the country where, in answer to requests for contributions, division heads of state or local health departments or voluntary agencies reviewed their year's program and planned together what they would submit. In some instances, it has caused health workers to examine their relationship to the professional health educator and to other public health personnel to accomplish the health education goals of their own field. In turn, it has sometimes shown the health educator how he has drawn on the specialized skills of his coworkers. True, these were only occasional by-products this year, but as the Sections continue to work together on future Centers, it should lead them to a more conscious examination of how all fields can coöperate effectively to achieve common health education aims.

As significant as the physical growth of the Center and the interest of more and more Association members in its preparation, is the increasing year-round use of its exhibits. No longer is the portfolio collection available after the meetting only in the New York library of the National Publicity Council. A limited number of the scrapbooks are reproduced by the Council for a nonprofit fee. Others are loaned for short periods to schools of public health, regional, and state organizations, with transportation costs the only charge. Members of such organizations will be offered an opportunity in the St. Louis Center to indicate which portfolios they wish to borrow, at what dates, and whenever possible requests will be fulfilled.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Ernani Braga, M.D., M.P.H., Box 1530, Special Service of Public Health, Rio de Janeiro, Brazil, S. A., Superintendent

Buford G. Hamilton, M.D., State Office Bldg., Div. of Health, Jefferson City, Mo., Director, Division of Public Health & Welfare

David M. Harmar, M.B., D.P.H., 5th Avenue South, Swan River, Manitoba, Canada, Medical Director, Swan River Health Unit

Adolph Jacoby, M.D., 151 W. 77th St., New York 24, N. Y., Director, Bureau of Social Hygiene, New York City Dept. of Health

Harold Kennedy, M.D., Martinsville, Va., Health Officer, Henry County

L. B. Lauritzen, M.D., Norregade 21, Hadersley, Denmark, County Medical Officer

W. G. Morson, M.D., C.M., Health Dept., Bay Springs, Miss., Medical Director, Jasper Smith Health Dept.

Donald C. Smith, M.D., D.P.H., County Bldg., Chatham, Ontario, Canada, Medical Officer of Health, Kent County Health Unit

May C. Welsh, City Hall, Malden, Mass., Health Agent, Malden Board of Health

D. Bruce Wilson, M.D., D.P.H., 150 College St., Toronto 5, Ont., Canada, Representative in Canada, The Rockefeller Foundation, International Health Division

Laboratory Section

Thelma G. Boughton, M.D., Harrisburg State Hospital, Harrisburg, Pa., Pathologist

Hope E. Davis, 1301 Cypress St., Santa Ana, Calif., Supervising Bacteriologist, Riverside County Health Dept.

Roderick C. Dwyer, 24 Greenview Ave., Jamaica Plain, Mass., Senior Bacteriologist, Division of Biologic Laboratories, Massachusetts Dept. of Public Health

Earl H. Fife, Jr., Dept. Serology, AMDRGS, Army Medical Center, Washington, D. C., In charge of Research Section, Dept. of Serology, Army Medical Dept., Research and Graduate School

Karl Hilberg, M.T., Health Dept. Laboratory, Michigan City, Ind., City Bacteriologist and Deputy Health Officer, Board of Health

Don C. Mackel, 2774 Myra St., Jacksonville, Fla., Trainee, Florida State Board of Health

Sister Mary Francis McRory, St. Mary's Infirmary, 1536 Papin St., St. Louis, Mo., Technician in Serology and Bacteriology

Manuel Moreira-Jacob, Ph.D., 4,3° Rua Victor Cordon, Lisboa, Portugal, Senior Research Bacteriologist of the Veterinary Laboratory, Ministry of Agriculture

Thelma F. Muraschi, 519 Mercer St., Albany 3, N. Y., Senior Bacteriologist, New York State Dept. of Health, Div. of Labs. and Research

Sidney Olansky, M.D., Venereal Disease Research Laboratory, USPHS, CDC, P. O. Box 185, Chamblee, Ga., Director

Kent T. Roark, Chattanooga Branch Laboratory, Chattanooga, Tenn., Asst. Director of Laboratories, State Dept. of Public Health

Richard E. Rosenfield, M.D., 51 E. 90th St., New York 28, N. Y., Asst. Immunologist, Rh Laboratory, Public Health Research Institute

A. M. Santos-Buch, M.D., 553 P. Valiente Num. 553, Santiago de Cuba, Cuba, Bacteriologist and Immunologist, Instituto Nacional de Hygiene

Dora J. Stringer, 550 Arlington, Chicago, Ill., Principal Serologist, Chicago Health Dept. Laboratory

K. Helen Thomas, Thomas Laboratories, P. O. Box 650, Yuma, Ariz., Manager

Thomas G. White, Box 263, Ava, Mo., Laboratory Technician, Division of Health of Missouri

Statistics Section

Ada M. Carr, 173 Ridgewood Drive, Syracuse, N. Y. Statistical Asst. and Deputy Registrar of Vital Statistics, Bureau of Vital Statistics, Health Dept.

Herbert Rich, 7611 18th Ave., Brooklyn 14, N. Y., Statistician, New York City Dept. of Health

Engineering Section

Stanley T. Barker, 41 Forest Ave., Albany, N. Y., Asst. Director, Bureau of Environmental Sanitation, New York State Dept. of Health

John M. Burton, 9 Eliot St., Jamaica Plain, Mass., Laboratory Asst., Metropolitan District Commission, Boston, Mass.

Sherman Comings, P. O. Box 116, Bacon County Health Center, Alma, Ga., Bacon-Jeff Davis County Sanitarian

John E. Donnelly, 1549 Idaho Ave., Idaho Falls, Ida., Senior Sanitarian, Idaho Dept. of Public Health

Loreta Gaillard, Box 855, Corsicana, Tex., Sanitarian, Corsicana-Navarro Health Dept.

Thomas B. Hyde, Health Dept., Alamogordo, N. M., Sanitarian, Otero & Lincoln Counties

Harry S. Jordan, M.S., State Dept. of Health, Phoenix, Ariz., Sanitary Engineer

Fred W. Kuhn, 1015¼ Chestnut St., Murphyboro, Ill., Sanitarian, Jackson County Health Dept.

Henry J. Ongerth, M.P.H., 1843 Berryman St., Berkeley 3, Calif., Senior Sanitary Engineer, State Dept. of Public Health

Theodore Oser, 591 Peachtree St., N. E., Atlanta, Ga., Vice President, Orkin Exterminating Co., Inc.

Vincent P. Parlette, 415 W. School St., Visalia, Calif., Sanitarian, Tulare County Health Dept.

J. William Robbins, 510 Glenbourne Ave., Cambridge, Md., Sanitarian, State Dept. of Health

James A. Robertson, 217 Cumberland Drive, Lebanon, Tenn., Senior Sanitarian, Wilson County Health Dept.

John C. Shilling, 5108 Delmar Blvd., St. Louis 8, Mo., Acting Chief, Rat Control Section, St. Louis Health Division

Howard W. Spence, M.P.H., 158 Putnam Circle, N. W., Atlanta, Ga., Asst. Executive Officer, USPHS, Communicable Disease Center

Prescott A. Stevens, M.S., W.H.O., Malaria Advisory Unit, Teheran, Iran, Public Health Engineer

Leo Weaver, State Health Dept., Bismarck, N. D., J. A. Sanitary Engineer, North Dakota State Health Dept., USPHS

Industrial Hygiene Section

J. Benson Cooper, 1165 Boca Chica Blvd., Brownsville, Tex., Sanitarian, Cameron County Health Unit

Arthur E. Hill, 28 Newburg Ave., Catonsville 28, Md., Technician, Consolidated Gas, Electric Light and Power Co., Baltimore, Md.

Arvil B. Pettit, Davison Chemical Corp., Baltimore 3, Md., Supervisor of Industrial Health & Safety

Food and Nutrition Section

B. Lucile Bridges, 53 Greenough St., Brookline, Mass., Program Director, New England Dairy & Food Council

Catherine Cowell, M.S., 51 Stuyvesant Place,

Staten Island 1, N. Y., Nutritionist, New York City Dept. of Health

Jeanne R. Homm, International Harvester Co., Highway 41, North, Evansville, Ind., Director, Home Economics Dept.

Maternal and Child Health Section

Guillermo Adriasola, M.D., M.P.H., Holanda 1335, Santiago, Chile, S. A., Asst., Escuela de Salubridad de la Universidad de Chile

Ruth D. Ballam, 86 Berkeley St., Boston, Mass., Asst. Director, Visiting Nurse Assn. of Boston

Philip S. Barba, M.D., 222 Harvey St., Philadelphia 44, Pa., Pediatrician

James J. Gibson, Jr., 1445 E. Broad St., Columbus, Ohio, Asst. Chief, Division of Child Hygiene, State Dept. of Health

Elizabeth Kirk Rose, M.D., 602 City Hall Annex, Philadelphia 7, Pa., Director, Division of Child Hygiene, Philadelphia Dept. of Public Health

Public Health Education Section

Roy W. Bashaw, Sr., Carrie Tingley Hospital, Hot Springs, N. M., Administrator, Carrie Tingley Hospital for Crippled Children

Keith M. Blossom, 1711 W. Earl Drive, Phoenix, Ariz., District Manager, Lily Tulip Cup Corp.

E. B. Burns, Jr., P. O. Box 207, Carrizo Springs, Tex., Senior Sanitarian, Southwestern Texas Health Unit

Thelma W. Carpenter, 408 E. Overland St., El Paso, Tex., Exec. Secy., American Cancer Society, El Paso County Unit

W. Kenneth Grubb, 1201 Spring Ave., Poplar Bluff, Mo., Health Educator, Division of Health of Missouri

Alvin Hamburg, M.P.H., 3372 Sutton Rd., Shaker Heights 20, Ohio, Student, Univ. of Michigan, School of Public Health

Genevieve D. Harkin, Ed.D., 235 Wooster St., New York 12, N. Y., Assoc. in Health Education Service, National Tuberculosis Assn.

Willard E. Knibbe, 446 S. 12th East, Salt Lake City, Utah, Health Educator, State Health Dept.

Jean A. Mitchell, 221 Korber Bldg., Albuquerque, N. M., State Commander, New Mexico Division, American Cancer Society

Florence W. Mixa, M.S.P.H., Univ. of Tenn., Dept. of P.H.Ed., Knoxville, Tenn., Acting Asst. Professor in Public Health Education

Benjamin Shimberg, Ph.D., Div. of Public Health Education, P.H.S., Washington 25, D. C., Asst. Chief, Research & Evaluation Services Branch

Orlando Jose da Silva, M.D., M.P.H., Av. Rio Branco 251, Rio de Janeiro, Brazil, S. A., Director of Health Education, Division Service Especial Saude Publica

Gertrude Szadzewicz, 26 Willis St., Pittsfield, Mass., Exec. Secy., Berkshire County Tuberculosis Assn., Inc.

Public Health Nursing Section

Agnes K. Ackermann, R.N., 4608a Arsenal, St. Louis 16, Mo., Consultant, Venereal Disease Control Service, Municipal Visiting Nurses

Juanita O. Baldonado, Box 744, Los Alamos, N. M., Public Health Nurse, Los Alamos Medical Center

Ursula J. Bracy, 4120 W. Belle Place, St. Louis 8, Mo., Student, St. Louis Univ.

Laura O. Copple, R.N., District Health Office 3, Ledalia, Mo., Public Health Nurse Supervisor II, Missouri Division of Health

Dorothy Doyle, SESP, Caixa Postal 621, Belem, Brazil, S. A., Public Health Nurse Consultant, Institute of Inter-American Affairs

Mary L. Frisz, 2179 Poplar Ave., Apt. 44, Memphis, Tenn., Educational Director, Nursing Service, Memphis and Shelby County Health Dept.

Clarice D. Hickman, 403 E. Jefferson St., Iowa City, Iowa, Director Nurse, Iowa City Visiting Nurse Assn.

Lillian N. Howell, 7 Fisher Park, Batavia, N. Y., District State Supervising Nurse, New York State Dept. of Health

Helen G. Kearsley, R.N., M.A., 166 Middle St., Braintree, Mass., Consultant in Pediatric Nursing, Massachusetts Dept. of Public Health

Esther Martinson, M.S., Vermont Dept. of Health, South Burlington, Vt., Director of Public Health Nursing Division

Norma J. Painton, R.N., M.A., 397 State St., Albany, N. Y., Consultant in Public Health Nursing Education, New York State Dept. of Health

Freda K. Parks, Box 552, Santa Fe, N. M., Maternity and Child Health Nursing Consultant, State Health Dept.

Marjorie Scaife, R.N., Box 26, Effingham, Ill., Supervising Nurse, Shelby-Effingham Bi-County Health Dept.

Alice E. Squire, 185 N. Kellogg St., Galesburg, Ill., District Supervising Nurse, State Dept. of Public Health

Goldie Voss, R.N., 2912 W. Belmont, Phoenix, Ariz., Public Health Nurse, Maricopa County Health Unit

Epidemiology Section

Arthur A. Calix, M.D., 311 Wm. David Parkway, Metairie, La., Chief, Tuberculosis Control Section, State Dept. of Health

Colonel George W. Hunter, III, M.S.C., 406th

Medical General Laboratory, APO 500, PM, San Francisco, Calif., Chief, Dept. of Medical Zoölogy

Leo Rosen, M.D., M.P.H., Institut de Recherches Medicales, Papeete, Tahiti, Society Islands, Asst. Surgeon(R), Laboratory of Tropical Disease, National Institute of Health, USPHS

School Health Section

W. R. Manlove, M.D., 700 Broad St., Nashville 4, Tenn., Director, School Health Service, Nashville City Schools

Dental Health Section

Frank Bisk, D.D.S., 250 West 26th St., New York, N. Y., Dentist, Private Practice

E. Taylor Dykes, D.D.S., 1239 Redondo Blvd., Los Angeles 35, Calif., Public Health Dental Officer, State Dept. of Public Health

Cyril L. Friend, D.D.S., M.P.H., P. O. Box 375, Carbondale, Ill., Public Health Dentist II, State Dept. of Public Health

Medical Care Section

Carl H. Gellenthien, M.D., Valmora Industrial Sanatorium, Valmora, N. M., Medical Director

James F. Jenkins, M.P.H., Herkimer Memorial Hospital, Herkimer, N. Y., Administrator

Walter J. McNerney, M.H.A., Univ. of Pittsburgh, Graduate, School of Public Health, Pittsburgh 13, Pa., Instructor, Hospital Administration

Gerald N. Rein, M.D., Chief, Public Health & Welfare, U. S. Army, HICOG,OLC for Bremen, APO 751, New York, N. Y.

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Unaffiliated

J. Clifford Alsup, B.B.A., 711 Taft St., Houston, Tex., Secretary-Treasurer, Standard Distributors, Inc., Auto-Chlor System

David M. Cox, 8 S. Dearborn St., Chicago 3, Ill., Public Relations Consultant, Editor, Lecturer, Northwestern University, Psychology Dept.

Arthur S. McQueen, M.D., 137 Montowese St., Branford, Conn., General Practitioner

Benjamin Pasamanick, M.D., 615 N. Wolfe St., Baltimore 5, Md., Asst. Professor of Public Health Administration, Johns Hopkins School of Hygiene

K. T. Toeplitz, M.D., P. O. Box 1561, Hobbs, N. M., Hobbs City Sanitary Officer

Harold E. Watson, A.M., 75 Washington St., Newport, R. I., Commissioner, Newport Water Works

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January and February Journals Wanted

Due to the large number of new memberships and subscriptions received during the first six months of the year, the supply of January and February, 1950, *Journals* has become depleted and the Circulation Department cannot supply these issues to certain members and subscribers whose names were added to the mailing list late in June.

Contributions of the January and/or February *Journals* will be welcomed and should be sent collect to the American Public Health Association, 1790 Broadway, New York 19, N. Y.

A.P.H.A. membership application blank on page XXXI

EXCHANGE OF CORRESPONDENCE BETWEEN A.M.A. AND A.P.H.A.

The following letters which are self explanatory are published in the JOURNAL by direction of the Executive Board:

AMERICAN MEDICAL ASSOCIATION
535 North Dearborn Street
Chicago 10, Ill.
July 12, 1950

Dr. Reginald Atwater, Secretary
American Public Health Association
1790 Broadway
New York 19, New York
Dear Doctor Atwater:

During the San Francisco session of the Association, the attention of the Board of Trustees, and of the House of Delegates, was called to a report of the Subcommittee on Medical Care of the Committee on Administrative Practice of the American Public Health Association with respect to the quality of medical care in a national health program. This report, which seems to have been quite generally circulated by the Subcommittee, has not, it was stated, been officially approved by the American Public Health Association.

Both the Board of Trustees and the House of Delegates strongly condemned the socialistic blueprint for medical care proposed by the recommendations of the Subcommittee on Medical Care and directed me to ascertain whether the Subcommittee's recommendations constitute the official policy of the American Public Health Association.

Will you be good enough to let me hear from you regarding this matter at your convenience.

Very truly yours,
(signed) GEORGE F. LULL

THE AMERICAN PUBLIC HEALTH ASSOCIATION INC.
1790 Broadway,
New York 19, N. Y.
September 8, 1950

Dr. George F. Lull
American Medical Association
535 North Dearborn Street
Chicago 10, Ill.
Dear Dr. Lull:

I welcome the opportunity afforded by your letter which calls to my attention recent action of the Board of Trustees and of the House of Delegates of the American Medical Association with reference to the draft of a proposed report of our Subcommittee on Medical Care called "The Quality of Medical Care in a National Health Program."

This report in question is the draft of a document published in the July, 1949, issue of the American Journal of Public Health and since reprinted in order to promote wide reading and discussion. As indicated in the footnote, it is published for the purpose of discussion and to secure comments by interested readers. You are quite right in believing that this report has not been officially approved by the American Public Health Association.

The American Public Health Association, as a matter of policy, encourages its committees and subcommittees to study problems in their field with diligence and directs that the conclusions that they reach, especially those in controversial fields, should be published for ample discussion.

The report in question on "The Quality of Medical Care" has been in circulation for thirteen months, has been widely reprinted, and has been called to the attention of everyone with a conceivable interest in the field. The response from readers has been voluminous and it has been recorded and faithfully circularized to members of the Subcommittee which has these comments under advisement and presumably will revise its draft for formal consideration by the Committee on Administrative Practice and the Governing Council of the Association.

The American Public Health Association believes that it is sound policy in the American tradition to allow free speech when important issues of this kind are presented. It encourages those who approve and those who disapprove to record their opinions, all of which will have thoughtful consideration. The Association believes that this is the essence of democracy and has an enduring confidence in the outcome of this method. It does not impose on its committees any censorship of an ideological or political nature.

It will be appreciated if you will make the position of the Association with reference to this proposed report a matter of record with the Board of Trustees and the House of Delegates in answer to their questions.

Very sincerely yours,
(signed) REGINALD M. ATWATER
Executive Secretary

EMPLOYMENT SERVICE

The following pages present information for those seeking qualified public health personnel and for those seeking positions in public health.

This is a service of the Association conducted without expense to the employer or employee.

POSITIONS AVAILABLE

District Health Officer for district of approximately 250,000 people with training center. Salary $6,000–$7,200 depending upon training and experience; automobile allowance $900 yearly. Write: Cook County Dept. of Public Health, 737 S. Wolcott Avenue, Chicago 12, Ill.

Health Officers—Kentucky has a few openings for county health officers at a salary to range from $5,100 to $7,200, depending upon experience, plus travel allowance of 7¢ per mile. If interested, contact: Bruce Underwood, M.D., State Health Commissioner, 620 S. Third Street, Louisville 2, Ky.

Director of Health Unit at Traverse City, Mich. State qualifications. Must be approved by Michigan State Health Dept. Apply either to Michigan State Health Dept., Lansing, Mich., or to the Grand Traverse-Leelanau County Health Dept., Traverse City, Mich.

Public Health Nurse—General nursing service. Grand Traverse-Leelanau County Health Dept., Traverse City, Mich. State qualifications. Apply to Health Director, Traverse City, Mich.

Qualified Public Health Nurses—2—generalized program; population 65,000; present staff, 8. Salary depends on experience and education; 40 hour week; retirement plan; mileage for personal car. Write: Director, Adams County Health Dept., Quincy, Ill.

Public Health Nurse Superviser for generalized service. Minimum requirements, public health certificate or a year of graduate study in public health nursing. Salary $3,576–$4,020; 40 hour week; retirement plan; sick leave; other benefits; Car furnished.

Public Health Nurses—Salaries $3,072–$3,432; $2,592–$2,952; depending upon qualifications, training, and experience. Car furnished.

For information on above positions write: Charles A. Neafie, M.D., Director, Dept. of Public Health, Pontiac 15, Mich.

Nutritionist—Detroit Health Dept.; must have baccalaureate degree with specialization in foods and nutrition, and one year's interneship in hospital approved by the American Dietetics Assn., or one year of graduate study in foods and nutrition; civil service position with full benefits of security, pension, duty disability provisions, good working conditions, vacation, and liberal sick leave provisions; salary, $3,300 to $3,618 per year. Apply to: Detroit Civil Service Commission, 735 Randolph Street, Detroit 26, Mich.

Public Health Nurse for Santa Cruz County; to work with 7 other public health nurses in generalized public health program. Qualifications: Bachelor's degree with a public health nurse's certificate equivalent to a California certification. Beginning salary $250 with increases to $300. Car is required and 8¢ per mile allowed for official business; 15 days vacation; 12 days sick leave annually, and a State Retirement System is in force. Write: R. O. Ingham, M.D., Health Officer, Santa Cruz, Calif.

Laboratory Technician for City Health Dept.; qualified to perform public health laboratory examinations, including milk and water analysis; salary dependent upon qualifications. Write: Lorain City Health Dept., Lorain, Ohio.

Medical Health Officer for Shelby-Effingham County Health Dept.; Central Illinois location; possibility of renting living quarters in health department building if no children; salary range $6,900–$9,000; may start above minimum; must have capacity for good public relations. Write: Mr. J. H. Griffin, Teutopolis, Ill., or to Dr. O. G. Kauder, Findlay, Ill.

Director of Nurses for County Health Dept. Salary $4,200 per year. Must own car, 8¢ per mile for mileage allowed. State Retirement System in force. Pleasant working conditions. Write: Saul Ruby, M.D., Director, Placer County Health Dept., 360 Elm Street, Auburn, Calif.

Public Health Nurse—Salary range $250–$290 per month according to educational qualifications and years experience. 39 hour week; generalized program; opportunity for advancement. Spokane Visiting Nurse Assn., Room 605, City Hall, Spokane, Wash.

Public Health Nurses desiring experience in rural health program in Southern Michigan, between Chicago and Detroit.

Good opportunities for outdoor recreation. Salary range depending on qualifications and experience $2,900–$3,300. Depreciation and mileage allowance on own car. 4 weeks vacation yearly, liberal sick leave. Field training for fellowship students. Write: Medical Director, District Health Dept., Coldwater, Mich.

Educational Director, General Nursing Supervisor and **Staff Nurses** in agency doing generalized public health nursing; total positions 24; 5 day, 40 hour week; 21 working days vacation; sick leave, retirement plan. Public health staff nurse salary range $2,520–$3,180. Supervisory personnel: Bachelor's degree major in public health required; experience in supervision; salary open. Write: Sophie Fevold, Director, Public Health Nursing Assn., 105 City Hall, Des Moines 9, Ia.

Public Health Physician for Regional Office, State Health Dept.; southern Illinois location; University town. Salary $5,760–$8,712. Excellent Civil Service and Retirement System.

Public Health Physician for Assistant Chief, Division of Local Health Services, State Dept. of Public Health. Salary range: $5,760–$8,712. May start above minimum.

Public Health Physician (2) for Division of Personal Health Services with special reference to Bureau of Epidemiology (General Communicable Disease Control and Venereal Disease Control Sections), State Dept. of Public Health. Salary Range: $6,900–$8,712. May start above minimum depending upon experience.

Public Health Physician for Champaign-Urbana Public Health District. Excellent grade and high schools; State University; population 48,000. Salary range: $7,500–$9,000. Competitive examination planned. For information on above openings, write: Roland R. Cross, M.D., Director, State Dept. of Public Health, Springfield, Ill.

Public Health Physician as Medical Director of Bi-County Health Dept. in southwestern Illinois on Ohio and Mississippi Rivers. Important public health job to be done. Salary $7,000. Apply: Dr. Emmett J. Gillespie, Secretary, Alexander-Pulaski Bi-County Board of Health, Cairo, Ill.

Vector Control Specialist, Berkeley, Calif., position with State Department of Public Health. Salary $395–$481. College graduate with specialization entomology, medical entomology, or parasitology and 3 years experience public health or sanitary engineer or entomology with one year in vector control. Write before November 10 for full information. Recruitment Section, State Personnel Board, 1015 L Street, Sacramento, Calif.

Public Health Nurse—Must have California Public Health Nurse Certificate. Generalized county health program. Salary $260–$300 per month, 38 hour week, 15 working days vacation, sick leave, travel expenses. Written examination waived. Write: Civil Service Commission, Room 105, Court House, San Luis Obispo, Calif.

State Laboratory Director—doctorate degree required plus successful administrative or teaching experience. Write: **Box A-92,** Employment Service, A.P.H.A.

Public Health Physician as Health Officer of a newly established county health dept. County of 20,000 on Mississippi River in northwestern Illinois. Salary range: $7,200–$9,000. Qualified health officer may start above minimum. Write: G. Alzeno, D.D.S., President, JoDaviess County Board of Health, Stockton, Ill.

Maternal and Child Care Superintendent—must have an M.D. degree, with 6 years' experience in administration of a maternal and child care agency; a degree in public health will be accepted in lieu of 5 years of such experience; vacation and sick leave privileges, Civil Service tenure and membership in an actuarially sound retirement system. Salary: $700 per month advancing to $775.

Preventable Diseases and Medical Services Superintendent—must have an M.D. degree with 8 years' experience in public health administration of which at least 1 year must have been in the field of epidemiology; a degree in public health will be accepted in lieu of 5 years of such experience; vacation and sick leave privileges, Civil Service tenure and membership in an actuarially sound retirement system. For information on above positions write: Milwaukee City Service Commission, City Hall, Milwaukee 2, Wis.

ANNOUNCEMENTS

Opportunities for Nurses in New York State

An examination will be held on November 18, 1950, for Assistant District Supervising Nurses—open to U. S. citizens—salary $3,451–$4,176; Bachelor's degree including approved public health nurse course is required. Apply before October 13 to New York State Department of Civil Service, Albany.

An examination will be held on the same date for District Supervising Nurses—open to New York residents only—salary $4,242–$5,232. Apply before October 13 to New York State Department of Civil Service, Albany.

ANNOUNCEMENTS (Cont.)

Wisconsin Civil Service

Examination for Position of Nutritionist II

Open to residents of the United States. Applications will be accepted until the needs of the service have been met. Salary begins at $324 per month, including bonus. For further information write to Bureau of Personnel, State Capitol, Madison 2, Wis.

Opportunity in California

Physicians interested in Psychiatry—$458–$556 and $584–$710 per month for new graduates and those with minimum of 3 years practice. Career opportunities throughout California. Three weeks vacation, sick leave, liberal retirement. Requires California license, or licensed by examination within 10 years in any other state. Write for descriptive brochure. State Personnel Board, Dept. E., 1015 L Street, Sacramento, Calif.

Openings for District Health Officers in New Mexico

District Health Officer positions in New Mexico Dept. of Public Health. Apply now. For further information and official application blanks, write to Merit System Supervisor, Box 939, Santa Fe, N. M.

Regular Corps Examination for Dental Officers United States Public Health Service

Competitive examinations for appointment of Dental Officers to the Regular Commissioned Corps of the U. S. Public Health Service will be held in various cities throughout the country. The examination will include professional written tests, a practical examination, an oral interview, and a physical examination. Completed applications must be in the Washington office by December 11, 1950. Appointments are permanent and provide opportunities for career service in clinical, public health, and research dentistry. Appointments will be made in the grades of Assistant and Senior Assistant, equivalent to Navy ranks of Lieutenant (j.g.) and Lieutenant, respectively. Entrance pay is $5,686.56 for Assistant Dental Surgeons with dependents, and $6,546 for Senior Assistants, including rental and subsistence allowance. For application forms and additional information write to: Surgeon General, U. S. Public Health Service, Federal Security Agency, Washington 25, D. C., Attention: Division of Commissioned Officers.

POSITIONS WANTED

Health Educator—female, B.S. in public health nursing, M.A. in hygiene and health education, nursing diploma from Bellevue Hospital. Rich and varied experience in health and social welfare, both private and public agencies, including health education in tuberculosis, classroom health teaching grades through college. Write: **Box H.E.-26**, Employment Service, A.P.H.A.

Health Educator—woman, Master of Public Health, Doctor of Education. Background of teacher training and official and voluntary agency work. Experience includes school and community health education, state and local; staff education and supervision, consultant service, and inter-agency coöperative projects. Write: **Box H.E.-27**, Employment Service, A.P.H.A.

Advertisement

Please direct all inquiries to Burneice Larson, Director, The Medical Bureau, Palmolive Building, Chicago 11, Illinois

Opportunities Available

PHYSICIANS WANTED—(a) County health officers and, also, tuberculosis control physician; Pacific Northwest. (b) Director of public health; generalized program including public health engineering, nursing, education, laboratory, and statistics; staff of twenty-five; department adequately financed; town of 35,000, short distance from university city; South. (c) Chairman, department of preventive medicine; university medical school; West. (d) Directors, division of tuberculosis control and venereal disease; state department of health, university town, 100,000; Middle South. (e) Director of student health; liberal arts college; 3,500 students; nine month year; $7,000 including apartment; South. (f) Epidemiologist to direct contagious disease control division including epidemiology and maternal and child welfare; city of 450,000, university center, Southwest. (g) Deputy state director of health; to assist state director in administration of department; $7,200–$9,600. (h) Public health physician; foreign operations of large industrial company. **PH10-1.**

WANTED—(a) Public health engineer; minimum three years' experience, preferably, in tropical or backward countries; $6,000, maintenance, other prerequisites; Arabia. (b) Director of health education; duties involve community-wide health education in twenty communities, schools, industry; New England. (c) Health educator to serve as program secretary, state organization; duties include serving several program committees, working with other health agencies on joint projects; $5,000–$6,000. (d) Public health engineer to direct industrial health program, county health department, California. (e) Director, division of health education, state department of health; duties consist of supervising state-wide program; public health education; Middle West. (f) Health educator and, also, nutritionist; heart disease control program; county-city health department. **PH10-2.**

WANTED—(a) Public health coördinator; four year collegiate nursing program; Master's degree with educational experience in public health nursing; coeducational college; 2,200 students; approximately 200 in school of nursing. (b) Public health nursing administrators, supervisors, and staff nurses; newly created department of health; town of 40,000, Southwest. (c) Public health nurse to direct outpatient clinic, small hospital located in heart of Sierra Nevada mountains. (d) Public health nurse to supervise health program, public school system; residential town, vicinity Washington, D. C. (e) Director of public health nurses and, also, several staff nurses; generalized program, county health program; resort area, Southern California. (f) Educational director, public health nursing association; university town of 200,000, Midwest. (g) Public health nurse to supervise student health department; administrative ability required; liberal arts college, Middle West. (h) Public health nurse to direct program, public schools; college town of 10,000, Midwest. (i) Public health nurse to serve as consultant, educational program, large industrial company. **PH10-3.**

Opportunities Wanted

DENTIST seeks administrative position in dentistry or related field; interested, also, education, research, B.A., D.D.S. degrees; considerable work toward M.P.H.; two years, public health dentistry.

HEALTH EDUCATOR; M.P.H., Harvard school of Public Health; several years, statistician; eight years, health educator, state department of health.

PUBLIC HEALTH nurse is available for administrative position; graduate of five year public health nursing course; B.S., Simmons; M.P.H. Health Education, eastern university; three years, director health education, state university; eight years' executive experience in public health nursing.

PUBLIC HEALTH PHYSICIAN; B.A., B.S., M.D., M.P.H., leading universities; eight years, director of student health, state university; past six years, director, metropolitan department of health; Diplomate, American Board of Preventive Medicine.

SANITARIAN; B.S. (Bacteriology, Chemistry) Eastern university; six years, sanitary engineer, state department of health; one year regional sanitary engineer in Greece

NEWS FROM THE FIELD

SIMPLE RULES FOR RADIOLOGICAL DEFENSE OF THE HOME

The following statement has been formulated by J. C. Geiger, M.D., Director of Public Health, City and County of San Francisco Department of Public Health, and five members of his Department after attendance at the Radiological Defense School at the U. S. Naval Damage Control Training Center, Treasure Island, Calif. The purpose of the document is to give home owners knowledge of what they should do in the event of atomic warfare. The statement has been reviewed by the Officer in Charge at the Radiological Defense School.

All persons should have a fundamental idea of methods of self-preservation in the event of a catastrophe resulting from atomic warfare. Everyone should be mindful that the atom bomb is another bomb only one of much more terrific power. It should also be remembered that the largest danger is from pressure and thermal heat and panic resulting from the burst. Radiation illness is a minor portion of the danger. Certain precautions and level-headed thinking and acting can definitely reduce the dangers from radiation.

Remain Calm—Respect It But Do Not Fear It

People in the home should have some advance ideas of certain rules that all should strictly adhere to. If atomic bombing is anticipated, no warning as to time of blast would be possible. All persons who can do so should remain indoors and away from windows. Remember that atomic radiations cannot be detected by sight, feeling, taste or smell. Detection is entirely dependent upon instruments.

Suggested Rules

1. The first warning will be explosion and flash.
2. Self-help is important and preparation should be made accordingly.
   (a) First-aid materials in the home, especially adequate burn-therapy material.
   (b) Wear light-colored, loose, washable, dispensable clothing and covering for hands and head.
   (c) Block Plan for mutual aid. People on each block should all know their neighbors and especially those who may need assistance, such as the sick, elderly persons and families with large numbers of children. It should also be known what means of transportation there may be available among the families on the block.
   (d) If it is possible, arrangements should be made for temporary shelter with a relative or friend in a nearby county in the event that local abode is made uninhabitable.
3. It should be borne in mind that if a person is protected against the flash burst within the first 90 seconds, radiation effects will be greatly reduced. One inch of steel, three inches of concrete and five inches of earth will afford protection. Immediately taking shelter behind any of these materials and remaining there for two minutes will greatly reduce the effects of radiation.
4. If you note a fireball in the sky do not be curious. Shield your eyes—look in the other direction—otherwise temporary blindness will result.
5. If you are located in an area that has escaped the blast, await authoritative instructions which may be by radio, sound truck or any other means. If fire becomes a hazard in the immediate vicinity move away in an orderly manner from the direction of the blast or from the direction in which the blast cloud may be moving.
6. Recognize and follow the advice of those in authority; particularly in traffic movement be guided by the military, police, or other recognized authority.
7. Food and water supply should not be touched until cleared by authorities. They may be contaminated.
8. Remember, if an atomic bomb should be exploded it may be so remote from your neighborhood (at least two miles from epicenter of explosion) that it would not be necessary for you to leave your home. Information pertaining to this will be disseminated by the authorities.
9. By all means, unless permitted to do so by an authorized representative of govern-

ment engaged in atomic or disaster defense, do not approach the affected area. Remain off the streets and relieve traffic congestion as much as possible.

10. Those who may be within the area affected by direct radiation from the burst should keep in mind that the symptoms of radiation sickness will develop within a few hours after the burst. At this time the primary symptoms would be nausea and vomiting. Persons who would experience such symptoms should seek medical aid at once. These symptoms may disappear a little later but might reappear weeks after at which time considerable damage would have been done.

WHO NEWS

World School Health Principles

For the first time in history, reportedly, basic principles for provision of health care for school children on a world-wide basis have been defined by WHO's Expert Committee on School Health Services. Meeting in Geneva, August 5–12, this committee stressed the belief that schools everywhere, but particularly in underdeveloped regions, should serve as public health demonstration centers not only to promote the child's health but also as an educational example for the community. School services should be organized as "team projects" involving parents, the community, professional groups, and social agencies, and should be a direct continuation of preschool services.

The suggested minimum continuous functions to be performed by school health services are:

Medical supervision and dental hygiene
Communicable disease control
Nutrition
Mental health
Health education

United States representation at this meeting included Myron E. Wegman, M.D., and Dorothy B. Nyswander, Ph.D.

Malaria Control in Pakistan

In a rural district in East Pakistan a WHO Malaria Control team provided antimalaria protection through DDT spraying in 1949 to a population of about 35,000 which has been stepped up in 1950 to about 250,000. Among the results reported are that not a single malaria case of new infection has been found since spraying operations began, that the typical malaria manifestation, enlarged spleen, has been reduced among children of the area from 72 to 21 per cent, and that the attitude of the population has changed from diffidence to requesting continuation and extension of the program.

The per capita cost of this protection has been estimated to be about one-third of an average rural laborer's day wage. Since he loses annually about 15 days work because of malaria his loss in wages is 45 times the cost of being protected.

Concurrently the team has carried on a survey of kala azar, finding about 10 per cent infected of 5,000 children tested. The team has also been carrying on public health work in villages, with emphasis on teaching hygiene and maternal and child health practices. Another feature of the project has been that each member of the team has one or more local understudies, so that local authorities can carry on the work after completion of the project.

The United Nations Children's Emergency Fund coöperated in the project by furnishing supplies and equipment.

International Syphilis Seminars

WHO has recently concluded two syphilis seminars in Europe to promote the exchange of information between American and European specialists on the various aspects of prevention, diagnosis, and treatment of syphilis. Treatment of nervous, early and congenital syphilis, sero-diagnosis, and antigen production were among the subjects discussed. The results of WHO-UNICEF campaigns against congenital syphilis, now under way in many parts of the world, were reviewed.

The Helsinki seminar, September 4–

10 was attended by about 25 specialists from the five Scandinavian countries and the United States. The Paris meeting included specialists from 10 European countries, the United Kingdom, and the United States.

Attacking Tuberculosis in India

The government of India and the Tuberculosis Association of India are receiving the coöperation of WHO and UNICEF in establishing three tuberculosis control demonstration centers, one in Delhi and one each in the Northeast and in the South. The aim of these centers, each manned by a team of WHO specialists, is to introduce modern methods of control into the country and to train local medical and public health personnel to carry on a continuing program. The three centers will serve as the nucleus of a network of such centers to provide a national tuberculosis service. It is expected that one center will be in operation late in 1950, the other two early in 1951.

The WHO tuberculosis program in India is directed by Drs. E. J. T. McWeeney of Ireland and W. H. Tytler of Canada.

Swedish Heart Team to Yugoslavia

Late in June a WHO team of six Swedish heart specialists headed by Professor Clarence Crafoord of Stockholm, arrived in Yugoslavia to introduce new techniques in the diagnosis and management of heart diseases in childhood. Cardiac clinics will be established in Zagreb to which WHO will furnish supplies.

Earlier the team had made a stay in Vienna demonstrating new surgical procedure. It also performed the first "blue baby" operation ever done in Austria and developed plans for children's cardiac clinics.

Before that country announced her withdrawal from WHO plans had also been completed for sending this team to Czechoslovakia.

NEW DIRECTORIES

The 1950 *American Medical Directory* of the American Medical Association, the first to be published since 1942, recently came off the press. It lists a total of 219,677 physicians, an increase of 22,617 or about 14 per cent over the number reported in 1942. American Medical Association, 535 N. Dearborn St., Chicago. $25.

On November 1, the second *American Dental Directory* of the American Dental Association, listing about 80,000 members, will be available. The first directory was published in 1947. American Dental Association, 222 E. Superior St., Chicago 11. $12.50; $10 if ordered before publication.

A first in directories is reported by Associated Publishers, Apartado 704, Mexico, D. F. On December 1, its *Directory of the Mexican Medical Profession*, reportedly the first for that country, will be published. In Spanish, the first printing will be 30,000 copies.

HELEN HAY WHITNEY FOUNDATION

The first report of the Helen Hay Whitney Foundation, 1947–1949 has recently been released by T. Duckett Jones, M.D., the Medical Director, New York.

The Foundation was organized within the framework of a preceding Charitable Trust early in 1947 with the contribution of capital funds totaling about $6,000,000 from the estate of Mrs. Helen Hay Whitney and from Mrs. Charles S. Payson, her daughter. Its immediate purpose is to stimulate and support research pertinent to the solution of the problem of rheumatic fever and rheumatic heart disease. Research grants of the Foundation have become effective beginning with October, 1947, and up to the end of 1949, consisted of a total of 18 grants, primarily in basic research as distinguished from applied research. Total grants up to the end of 1949 approximate $400,000.

The greater part of these funds have been designated to support the work of established or career investigators possessing unusual opportunities and facilities for the conduct of their investigations. There is frequent emphasis on chemical methods, chiefly enzymatic and hormonal chemistry. The recent interest in the possible role of adrenal hormones in rheumatic fever is reflected. The Foundation, according to the *Report,* seeks to provide for flexibility in the development of its research program and policies. It is preparing individual state reports on rheumatic fever activities for distribution on a service basis to agencies within the states that are actively engaged in some phase of care activities.

NATIONAL CONFERENCE ON AGING

A National Conference on Aging described as an exploratory forum was held on the call of the Federal Security Administrator and upon the request of the President of the United States in Washington, August 13–15. Eight hundred persons specially selected because of their interest in the aging process and its community significance participated in a working conference made up of ten sections as follows:

Section I—Our Aging Population
A—Aging Research
B—Population Changes and Economic Implications
Section II—Employment, Employability, Rehabilitation
Section III—Income Maintenance
Section IV—Health Maintenance and Rehabilitation
Section V—Education for an Aging Population
Section VI—Family Life, Living Arrangements, and Housing
Section VII—Creative and Recreational Activities
Section VIII—Religious Programs and Services
Section IX—Community Organization
Section X—Professional Personnel

Section IV on Health Maintenance and Rehabilitation was under the Chairmanship of Dean W. Roberts, M.D., Deputy State Health Officer for Maryland. Seven committees reviewed this subject of Health Maintenance and Rehabilitation and discussed the subject under headings of Health Promotion; The Etiology and Epidemiology of Degenerative Diseases; Detection, Treatment and Care; Adequate Care of Patients with Extreme Handicaps and Severe Impairments of Health, Rehabilitation; Environmental Health Needs; and Community Planning for Health.

The Conference included four half-day sessions given over to committee work, and the resulting conclusions will be published as proceedings in the near future. The objectives of the forum were reëvaluation of the potentialities of older people toward insuring their useful and satisfying participation in the life of the community; stimulating the exchange of ideas among persons of varied experience with a view to solving problems of the aging through voluntary and public organizations in each state, city, and community; finding the nature and extent of these problems as they affect the individual, families and communities; promoting research on aging in such fields as employment, health, education, recreation, rehabilitation, and social and psychological adjustment.

Among persons from the field of public health in attendance at the conference were:

Reginald M. Atwater, M.D., Walter L. Bierring, M.D., E. M. Bluestone, M.D., Frank G. Boudreau, M.D., Gertrude H. Bowling, Leroy Burney, M.D., Frank Calderone, M.D., Mary F. Champlin, Martin Cherkasky, M.D., Edward Cohart, M.D., Marion H. Douglas, R.N., Louis I. Dublin, Ph.D., Thomas D. Dublin, M.D., Thomas Fansler, A. L. Frechette, M.D., Ruth B. Freeman, R.N., Edith M. Gates, Franz Goldmann, M.D., Ruth W. Hubbard, R.N., Ancel Keys, M.D., Joseph H. Kinnaman, M.D., E. R. Krumbiegel, M.D., Anthony J. Lanza, M.D., Paul B. Lemkau, M.D., Morton L. Levin, M.D., Bleecker Marquette, Loren D. Moore, M.D., H. B. Mulholland, M.D.,

Thomas Parran, M.D., M. Allen Pond, Ellen C. Potter, M.D., Edward S. Rogers, M.D., Emilie G. Sargent, R.N., R. R. Sayers, M.D., Cecil G. Sheps, M.D., Rae K. Shoemaker, Milton Terris, M.D., Felix J. Underwood, M.D., Gertrud Weiss, M.D.

ENGINEERING EDUCATORS HONORED

The American Society for Engineering Education during its recent annual meeting conferred honors on the following engineering educators:

Professor Fred B. Seely, University of Illinois — received the Lamme Medal for distinguished contributions to teaching and engineering administration.

Professor Rolf Eliassen, Massachusetts Institute of Technology — George Westinghouse Award for outstanding teaching in engineering.

Dean Harry P. Hammond, Pennsylvania State College — the James H. McGraw, Sr. Award for distinguished contributions to technical institute education.

Dean F. M. Dawson, State University of Iowa, was elected president of the Society.

CANADIAN PUBLIC HEALTH ASSOCIATION

The 38th annual meeting of the Canadian Public Health Association, held in Toronto June 12–14, was characterized by a number of special events. Among these was the first annual meeting of the Ontario Public Health Association.

Another special event was an appreciation to John T. Phair, M.B., D.P.H., President of the Association, of the 28 years of services contributed, first as honorary general secretary for 23 years, and ending with the presidency in the current year. In expressing the Association's appreciation, F. W. Jackson, M.D., director of health insurance studies, Department of National Health and Welfare, said in part, "Your 28 years of service to a voluntary agency has no equal in Canada—Because of the Association's need, you gave your best; because of your ability, the Association has succeeded."

The speaker at the annual dinner where the ceremony in honor of Dr. Phair took place was Reginald M. Atwater, M.D., Executive Secretary of the American Public Health Association. He listed mental hygiene, accident prevention, dental hygiene, housing, air pollution, among a host of unfinished jobs of public health that challenge Canadian public health workers no less than those of the United States. At this dinner also G. D. W. Cameron, M.D., D.P.H., Deputy Minister of National Health, was installed as president of the Association for 1950–1951. Other officers are:

President-elect: Dr. M. S. Elliott, director, Extension Health Services, Department of Health and Public Welfare, Province of Manitoba

Vice-presidents: T. J. Lafreniere, C.E., chief engineer, Ministry of Health, Province of Quebec; Trenna Hunter, director of Public Health Nursing Service, Vancouver, B. C.; Dr. Leonard Miller, deputy minister of health, Province of Newfoundland; Dr. B. C. Keeping, deputy minister of health, Province of Prince Edward Island

Honorary Secretary: Dr. William Mosley, director, East York—Leaside Health Unit, Ontario

Honorary Treasurer: Dr. J. H. Baillie, assistant medical director, The Bell Telephone Company of Canada, Toronto

Editor, Canadian Journal of Public Health: Dr. R. D. Defries, director, School of Hygiene and Connaught Medical Research Laboratories, University of Toronto

POISONING FROM NEW INSECTICIDES

Among the new insecticides now being widely employed throughout agricultural communities are several with organic phosphates as active constituents. Among these compounds, parathion is one of those most commonly used. It is reported by the American Cyanamid Company, the manufacturers, that this compound, like many other pesticides, is highly toxic for man. Numerous cases of poisoning and a few deaths have occurred from its careless application. These compounds, which are cholinesterase inhibitors, present problems of

acute poisoning which are unlike those previously encountered. It is reliably reported that in this medical emergency the proper timing and dosage of the antidote atropine may be life saving.

The symptoms of poisoning from parathion include giddiness, headache, nausea, vomiting, abdominal cramps, diarrhea, contraction of the pupils, sweating, salivation, confusion, weakness and muscular twitchings. A sense of tightness is felt in the chest as the bronchi constrict and fill with mucus. Fatalities appear to result from constriction and secretions in the bronchi or arrest of the heart. However, it is said that recovery from the acute poisoning is usually complete and uneventful. There has been no evidence of permanent injury in such cases.

According to the announcement of the manufacturers, treatment may be effective if atropine in the dose of 1 or 2 mg. per hour up to a daily total of 20 mg. of the drug is given, preferably intravenously, supplemented with postural drainage of the bronchi, followed by the use of oxygen. Morphine is said to be contraindicated. Artificial respiration may be required for a considerable period. These phosphate insecticides are not locally irritating.

STATISTICIANS COÖPERATE

At the 110th annual meeting of the American Statistical Association in December, the Statistics Section of the American Public Health Association will for the first time be a joint sponsor of several of the sessions. These joint sessions are as follows:

Recent Population Changes, Dorothy Thomas, Ph.D., Dec. 27, 10–12 a.m.; Measurement of Morbidity, Harold Dorn, Dec. 27, 4–6 p.m.; Statistical Methods in Medicine, Hugo Muench, M.D., Dec. 29, 10–12 a.m.

All meetings will be held in the Congress Hotel, Chicago. Further information and final program from Mortimer Spiegelman, Metropolitan Life Insurance Company, 1 Madison Ave., New York 10.

NEW CLINICAL PATHOLOGY LABORATORY

In July a new model clinical pathology laboratory was established in Atlanta, Ga., jointly by three independent voluntary and public health agencies. The reported objectives of this new research center are to develop more reliable methods for clinical laboratories and to educate and train laboratory personnel. Prepared to serve the entire United States, it is said to be "the first laboratory of its kind anywhere linking the hospital ward, the dispensary, and the clinic with the field work of public health."

The agencies coöperating in the venture are the Communicable Disease Center of the Public Health Service, Grady Memorial Hospital, and Emory University School of Medicine, all in Atlanta. The head of the laboratory is F. William Sunderman, M.D., pathologist in charge, clinical pathology section of the CDC and president-elect of the American Society of Clinical Pathologists.

TROPICAL HYGIENE COURSE FOR NURSES

What is said to be the first course in parasitology and tropical hygiene for graduate nurses in the United States has been announced by the School of Tropical and Preventive Medicine of Loma Linda. It is designed primarily for graduate nurses who are going to the tropics as mission board appointees, but will be valuable also to any nurse interested in tropical public health. The six week study represents a full-time program and includes instruction in parasitology, laboratory methods, tropical hygiene and sanitation, nutrition, and tropical medicine and nursing. The course will be given from February 19 to March 30, 1951. Tuition is $75. Applications for admission to Director, and for room accommodations, to Mil-

ton Murray, Public Relations' Office, School of Tropical and Preventive Medicine, College of Medical Evangelists, Loma Linda, Calif.

COURSE FOR PHYSICAL THERAPISTS

The Institute of Physical Medicine and Rehabilitation of the New York University-Bellevue Medical Center is repeating its special course in Advanced Rehabilitation Methods for physical therapists three times in the school year 1950–1951. Now a four week course, it is divided into three sections, on severe disabilities and their rehabilitation, skills and methods of functional activities, and clinical experience.

The course is open to certified physical therapists on approval of the curriculum director, and merits four points of undergraduate or postgraduate credit. Tuition is $62 and registration $3. Veterans may enroll under the GI Bill of Rights. Dates are November 27–December 22, 1950, January 8–February 2, 1951, and April 9–May 4, 1951. Apply to Edith Buchwald, Institute of Physical Medicine and Rehabilitation, 325 E. 38th St., New York 16.

SMALL COUNTY CASUALTY

The *Texas Health Bulletin* for August carries this brief obituary; "Effective July 1, 1950, the Bee County Health Unit was discontinued." The 1940 population of Bee County was 16,500. On the basis of the 10 year increase in the population of Texas, the county in 1950 has about 20,000 inhabitants.

INFECTIOUS HEPATITIS—AN OCCUPATIONAL DISEASE?

During an outbreak that centered around a central rural school in Yates County, New York, in May, 1950, and which involved some 120 cases of infectious hepatitis, two physicians investigating the outbreak contracted the disease. The epidemic is still under study and will be reported later. The two physicians were members of the team of six investigators who made house-to-house canvasses of cases. None of the individuals of the families visited were apparently ill with hepatitis at the time, but evidently someone was carrying the virus. Both of the physicians affected are recovering after nearly two months of convalescence.

LEAVENWORTH JOINS THE PROCESSION

Leavenworth County, Kansas, has a population of something over 40,000, about half of which is in the city of the same name. It has just become the 19th Kansas county to organize a full-time local health department. The Health Officer of Leavenworth City-County Health Department is Harle V. Bennett, M.D., who received the M.P.H. degree from Harvard University in June. Previously he had been Health Officer in Topeka-Shawnee County and in Montgomery County. Before taking his medical training he had been bacteriologist with the State Department of Health.

CALIFORNIA GETS FISCHER LIBRARY

The Fischer library on biochemistry has been presented to the University of California by Hermann O. L. Fischer, Ph.D., of its department of biochemistry. The collection was the working library of his father, Emil Fischer, a pioneer in biochemistry research. It contains a particularly comprehensive group of periodicals covering the fields of chemistry and biochemistry. Many of the sets are complete from the first mid-19th century to the present. This material has been made the nucleus of a library in the virus laboratory and biochemistry building soon to be constructed at Berkeley.

APPROVE FULL-TIME HEALTH UNITS

The Montana State Medical Association at its recent annual meeting approved a resolution to lend support to full-time local health units. It also

recommended that a public health commission be established in the Association to serve in an advisory and liaison capacity with the new state health officer, G. D. Carlyle Thompson, M.D. This commission would be made up of the president, the 12 chairmen of the scientific committees concerned with public health, and 3 members at large.

LONDON STUDIES ON HEIGHT AND WEIGHT OF SCHOOL CHILDREN

A report published by the London County Council on the heights and weights of school pupils in the County of London in 1949 draws conclusions which throw light on present application of older height-weight tables:

1. Between 1938 and 1949 the average height of London school children increased by about 2 cm. (¾ in.) and the average weight increased by about 0.8 kg. (1¾ lb.).

2. Despite these substantial changes, the pre-war relationship between weight and height was generally maintained. By *pre-war* scales of growth, post-war children appear 3 months older than their true ages.

3. Though the greatest improvement has been in those districts which were above average in 1938, there has been a definite improvement in the worst areas where war conditions produced greatest retardation and where it was known that progress would be most difficult to achieve.

COLORADO RHEUMATIC FEVER LIBRARY

The University of Colorado School of Medicine has established a Rheumatic Fever Library. It is hoped that this library will contain reprints or copies of every article that has been written on rheumatic fever. This material will be cross-indexed and assembled in bound volumes by years, and ultimately made available to workers in the field of rheumatic fever in the form of a photostat and abstract service. Valuable assistance can be given by those writing in the field and those willing to dispose of reprint collections. Reprints and inquiries should be sent to Ward Darley, M.D., Dean, University of Colorado School of Medicine and Hospitals, 4200 East Ninth Avenue, Denver 7.

NATIONAL COMMITTEE FOR THE PREVENTION OF ALCOHOLISM ORGANIZED

The National Committee for the Prevention of Alcoholism was organized in Los Angeles on July 26 under the Chairmanship of Andrew C. Ivy, M.D., Vice-President of the University of Illinois, Chicago. Its objects, according to an announcement, will be education and the promotion of abstinence. The Vice-Chairman is Haven Emerson, M.D., and the Secretary is W. A. Scharffenberg, 6840 Eastern Avenue, Washington, D. C. Incorporation is planned for and a second Institute for Scientific Studies on Alcohol for July 1951 is planned in Los Angeles, Calif.

NEW YORK'S NEW LIBRARY LAW

The recent session of the New York State Legislature enacted a law providing for state aid to local libraries—provided they operate on a federated county or multi-county system. In addition to widening the usefulness of libraries, one of the major purposes of the legislation is to encourage libraries to federate into systems serving entire counties or groups of counties. In such systems, books and periodicals in one library would be available to readers in all the libraries of the system. Three of the state's counties and New York City are already organized in such systems.

MINE SAFETY EQUIPMENT LABORATORY

What is reported to be the world's largest research laboratory devoted to the development of safety equipment for all industries was dedicated in June by the Mine Safety Appliances Com-

pany. In his address, the principal speaker at the dedication ceremonies, Ned H. Dearborn, president of the National Safety Council, pointed out that the laboratory represented science coupled with responsibility. William P. Yant is the company's director of research and development.

INTERSTATE MILK SHIPMENTS

A National Conference on Interstate Milk Shipments was held in St. Louis, Mo., June 1–3 with J. L. Rowland of the Bureau of Food and Drugs, Missouri Division of Health, serving as chairman. The object of the conference was to provide ways for "the best possible milk supply for all the people," through better coördination of activities by official regulatory offices and the dairy industry. The group agreed that:

1. The U.S.P.H.S. Milk Ordinance and Code should be used as the basic regulation.

2. That states receiving "out of state" milk should recognize supervision and inspections by full-time employees of local and state health departments and state agriculture departments.

3. Supervision under 2, above, should be conducted in accordance with the procedures outlined in U.S.P.H.S. Bulletin 1970 *Milk Sanitation Rating*.

4. States receiving out of state milk should accept quality ratings made only by certified rating officials of the U.S.P.H.S. or of some other state health department.

5. Laboratory methods should adhere strictly to *Standard Methods for the Examination of Dairy Products*.

Twenty-six states were represented by officials from different departments of government. At least 19 representatives from industry were present. The National Conference of Interstate Milk Shipments has been formed as a permanent organization to encourage interstate shipments of milk. Another meeting will be held in St. Louis, June 4–6, 1951. J. L. Rowland was elected chairman of the conference.

PERSONALS

GEORGE BAEHR, M.D.,* New York City, has been appointed special consultant to the New York State Department of Health and the State Office of Medical Defense. Dr. Baehr served in World War II as medical director, National Office of Civil Defense.

N. BERNETA BLOCK, M.D., has been appointed health commissioner of Erie County-Sandusky, Ohio, succeeding DUANE D. LOVE, who served on a temporary basis.

JOHN J. BOURKE, M.D.,* executive director of the New York State Joint Hospital Survey and Planning Commission, has been appointed special consultant to the Office of Medical Defense, New York State Department of Health. During World War II he was research director of the Health Preparedness Commission.

RUTH E. BOYNTON, M.D.,* professor of preventive medicine and public health, University of Minnesota since 1938, has been named president of the Minnesota State Board of Health, succeeding THOMAS B. BAGATH, M.D., resigned.

E. H. BRAMHALL,* formerly director of the Division of Laboratories, Utah State Board of Health, joined the staff of the Division of Laboratories, California State Department of Public Health, to be in charge of the work of the division relating to local public health laboratories.

C. L. BRUMBACK, M.D.,† formerly with the U. S. Atomic Energy Commission, Oak Ridge, Tenn., has been appointed health officer of the Palm Beach County Health Department with headquarters at West Palm Beach, Fla.

JOHN W. CLINE, M.D., assistant clinical professor of surgery at Stanford University Medical School, was made President-Elect of the American Medical Association at its recent San Francisco session.

H. CARY COPPOCK, M.D.,† has resigned as Kittitas County (Wash.) health officer following which the county, under a "gentlemen's agreement," joined Yakima County in forming a district health department with the present Yakima health officer, STANLEY R. BENNER, M.D., serving the district. The assistant health officer, ALF H. B. PEDERSEN, M.D., is stationed in Ellensburg.

ELIZABETH C. CROSBY, Sc.D., professor of anatomy at the University of Michigan Medical School, is the 1950 recipient of the American Association of University Women's annual $2,500 achievement award for her

accomplishments in the field of neuroanatomy, particularly her recent studies of the mid-brain and cerebral cortex in the primates.

RAYMOND A. DEBO, M.D., has been appointed health officer for the administrative unit of Sumter and Pasco Counties, Fla., with headquarters at Dade City.

BEECKMAN J. DELATOUR, M.D., associate professor of medicine at New York University since 1944, became on July 1 clinical director and director of medical service at the American Hospital of Paris, now fully restored for meeting civilian needs.

J. V. DEPORTE, PH.D.,* director of the New York State Health Department Office of Vital Statistics has been made a Commander of the National French Order of Public Health and received from the French Government a scroll and elaborate gold medallion, by order of M. Pierre Schneiter, French Minister of Health and Population, for his distinguished work in the field of vital statistics and population studies.

WALTER DICKINSON, who has recently served on the staff of the Niagara County Tuberculosis and Health Association, Niagara Falls, N. Y., has been appointed Executive Secretary of the Saratoga County Tuberculosis and Public Health Association, Saratoga Springs, N. Y.

DONALD DUKELOW, M.D.,* and RUTH TAYLOR * have been loaned to the Midcentury White House Conference by the American Medical Association and the Children's Bureau respectively, to assist in preparing the Health Section of the Conference Fact Finding report.

PHILIP R. EDWARDS, PH.D.,† Communicable Disease Center, Chamblee, Ga., represented the American Public Health Association and the Subcommittee on Enteric Phage Typing of the Coördinating Committee on Laboratory Methods, at the 5th International Congress for Microbiology in Rio de Janeiro, August 17–24. He also visited laboratories in several South and Central American countries.

NATHANIEL WALES FAXON, M.D., who retired in 1949 as director of Massachusetts General Hospital and Massachusetts Eye and Ear Infirmary, Boston, received the American Hospital Association's Award of Merit at the Annual Banquet, September 21, during the Atlantic City convention of the Association.

JACOB C. GEIGER, M.D.,* director of public health, city and county of San Francisco, Calif., has been appointed consultant in public health to the Surgeon General, U. S. Navy, "for consultation to the naval medical activities in the San Francisco and Pacific areas."

LEONARD J. GOLDWATER, M.D.,* professor of Industrial Hygiene at the School of Public Health, Columbia University, has been awarded a World Health Organization Fellowship for the study of Occupational Medicine in several European countries. He goes abroad early in October, 1950, for a period of about 2 months, dividing the time between England, France, Switzerland, and the Netherlands.

FEDERICO GOMEZ, M.D., of the Maternal and Child Health Section, Pan American Sanitary Bureau (Regional Office of the World Health Organization), attended the Sixth International Pediatrics Conference, in Zurich July 24 to 28, and later participated in the Geneva Seminar on Pediatrics under the auspices of the World Health Organization and the United Nations International Children's Emergency Fund, August 1 to 10.

ELIZABETH B. HAGER, former instructor in public health nursing, Burbank Hospital, Fitchburg, Mass., is the new community public health nurse in the Town of Shirley, one of the towns in the Nashoba Associated Boards of Health, Mass.

ALFRED M. HELLMAN, M.D., consulting gynecologist and obstetrician of Lenox Hill Hospital and former president, New York County Medical Society, has been appointed medical consultant to the Health Information Foundation.

HENRY F. HELMHOLZ, M.D., chief consultant for the Midcentury White House Conference attended as a member of the executive committee, of the International Congress on Pediatrics at Zurich, Switzerland, July 24–28, and spoke at the opening session on the International Pediatrics Organization.

JEAN HENRY,† associate director of the Bureau of Public Health Nursing, New York State Department of Health, retired on August 31 after serving the department for 21 years.

EDITH HOLT-HARRIS, office and visiting nurse in the New York State Department of Health, retired from state service on September 1.

ALAN D. HOUSER, M.D.,† former assistant director, Johnstown Health District, New York State Health Department, is now health officer of St. Mary's County, Md., with headquarters in Leonardtown.

EVELYN B. JOHNSON, M.D., formerly pediatrician and associate cardiologist with the Minneapolis Children's Heart Clinic in Minnesota, has joined the staff of the Maricopa County, Arizona, Health Unit as pediatrician.

T. DUCKETT JONES, M.D., medical director of the Helen Hay Whitney Foundation, has been made chairman of the American Council on Rheumatic Fever of the American Heart Association.

ARVILLE KRAUS, has been appointed as hearing technician with the Maternal and Child Health Division, Arkansas State Health Department, to operate a sound-proof truck, doing threshold testing in public schools over the state as part of the Hearing Conservation Program.

ARNOLD B. KURLANDER, M.D.,* chief of the Division of Tuberculosis and acting chief of the Bureau of Local Services, has left the Ohio Department of Health for a new assignment with the U. S. Public Health Service in Washington.

JAMES H. LADE, M.D.,* of the Division of Medical Services, New York State Department of Health, has been appointed director of the newly created Office of Medical Defense.

LUCILE LUKENS, employed in the Umatilla County Health Department and Pendleton schools for the last 10 years, has been appointed generalized public health nursing consultant for the State Board of Health in eastern Oregon.

STEPHEN C. F. MAHADY, M.D., former chief of service and director of the research laboratory at Firland Sanatorium in Seattle, Wash., has been provisionally appointed hospital medical management advisor, assigned to the Bureau of Tuberculosis Hospitals, Division of Tuberculosis Control, New York State Health Department.

KARL F. MEYER, M.D.,* professor of research medicine at the University of California and director of its Hooper Foundation for Research Medicine, was recently presented with the James D. Bruce Memorial Award of the American College of Physicians.

JANICE MICKEY, R.N., M.S.,* has been appointed associate professor of public health practice (Nursing) at the University of Pittsburgh Graduate School of Public Health. Miss Mickey from 1946 to 1948 was assistant professor at the School of Public Health, University of Minnesota, since which time she has been chief nurse with the Bureau of Public Health Nursing, Pittsburgh.

ROBERT F. MOORE, M.D., formerly of Hinesville, Ga., is now health officer of the Monroe County Health Department with headquarters at Key West, Fla.

RICHARD S. MUNGER, M.D., has succeeded Ross M. GALVIN, M.D., as health officer of Lewis County, Wash.

RAYMOND N. NELSON, M.D., formerly health officer in the unit composed of Pasco, Sumter and Citrus Counties, has recently resigned and assumed his duties as health officer in the unit composed of Walton, Okaloosa and Homes Counties, Fla.

MYRON M. NICHOLS, M.D., who served 3 years with the Army in Puerto Rico and Panama, is now pediatric consultant, Division of Maternal and Child Health, Arkansas State Health Department.

RICHARD A. NIPLE, M.D., is the newly appointed health commissioner of Belmont County, Ohio.

EVLYN MAY PEDERSON, R.N., M.S., for the past 3 years instructor in business and psychology at the University of Houston and a consultant for a business advisory service, has been named dean of the University of Houston College of Nursing.

ROBERT M. RUSSELL, M.D.,† has been appointed health officer in the administrative unit of Citrus, Hernando and Levy Counties, Fla.

BROOKS RYDER, M.D.,† administrator of the Bingham Associates Program in Boston, has been appointed a consultant to the Public Health Service, to work with the Division of Medical and Hospital Resources in developing programs of regional hospital coordination.

CLARENCE G. SALSBURY, M.D., who obtained national recognition for his work among the Navajo Indians of Arizona, has accepted a position as chief of the Bureau of Preventive Medical Services with the Arizona State Health Department.

ROSE ANN SCHAFFER, has resigned as public health nurse of Huron County-Norwalk, Ohio.

MARGARET L. SHETLAND, R.N.,* has resigned as associate director, Bureau of Public Health Nursing, State Department of Health, Lansing, Mich., to become director Department of Public Health Nursing, State University of New York, Medical Center at Syracuse University, N. Y. Miss Shetland is the secretary of the Public Health Nursing Section, A.P.H.A.

GEORGE A. SILVER, M.D., M.P.H.,* health officer of the Eastern Health District of the Baltimore City Health Department and assistant professor of public health administration at the Johns Hopkins School of Hygiene and Public Health, has been awarded a World Health Organization fellowship, to study teaching methods of preventive medicine and public health administration carried out in various European universities, health departments, and teaching centers in the United Kingdom, Denmark, Finland, and the continent.

JAMES F. STRAUSS, M.D., is now district health officer for the Benton and Franklin County Health District, Wash.

IRVING R. TABERSHAW, M.D.,† director of Eastern Medical Division, Liberty Mutual Insurance Company, and associate professor of industrial hygiene, Columbia University, New York City, is presently in Germany on a special assignment for the State Department. He is making a survey of current industrial medical problems with a view toward assisting the Western German nation to develop a modern industrial hygiene program.

ELLSWORTH R. THWING, director of health and physical education at Aurora College, is the new director of health education of the Illinois Tuberculosis Association succeeding CARL FOX,† who resigned to become executive secretary of the Georgia Tuberculosis association.

WALTER D. TIEDEMAN,* formerly Chief, Milk and Restaurant Sanitation Section, New York State Department of Health, has been appointed as resident lecturer, School of Public Health, University of Michigan, and director of the Testing Laboratory for the National Sanitation Foundation, Ann Arbor, Mich. Mr. Tiedeman is Chairman of the Subcommittee on Reciprocal Sanitary Milk Control of the Committee on Administration Practice of the A.P.H.A.

ERNEST S. TIERKEL, D.V.M.,† assistant chief of the veterinary public health branch, Communicable Disease Center, Atlanta, in charge of the Center's rabies control studies, has been named to a 5 year term on the World Health Organization's expert panel on rabies.

HAMPTON H. TRAYNER, M.D., has been appointed Whitman County (Wash.) health officer, succeeding, W. A. MITCHELL, M.D.

JOHN T. TRIPP, PH.D., has resigned as assistant director, Division of Laboratories, Michigan State Department of Health, Lansing, to become Chief of the Section on Human Blood Products, Laboratory of Biologics Control, Microbiology Institute, Bethesda, Md. The Section will continue to establish standards for the production, testing, and sterilization of whole blood, plasma and other blood products, and conduct basic research in the preparation and preservation of blood for use in transfusion.

DAVID VAN DER SLICE, M.D.,* formerly consultant in school health, California State Department of Public Health, has been appointed to the newly created position of Coordinator of Health Services, Oakland Public Schools, Oakland, Calif.

EDDA VON BOSE, M.D., acting head for the past year, has been appointed head of the tuberculosis control division of the San Antonio (Tex.) Health Department.

ALONZO S. YERBY, M.D., M.P.H.,† who has been serving with the Office of the High Commissioner in Germany in a public health capacity, has returned to the United States and has joined the staff of the Health Insurance Plan, New York City, as assistant medical director.

ALEXANDER ZEISSIG, D.V.M.,† has resigned as veterinary consultant in communicable diseases, New York State Department of Health, and has been appointed a staff member of the Pan American Sanitary Bureau for assignment in Montevideo, Uruguay. Dr. Zeissig has been veterinary consultant to the A.P.H.A. Merit System Service.

THE FOLLOWING APPOINTMENTS HAVE BEEN MADE TO THE RALSTON PURINA COMPANY RESEARCH STAFF, ST. LOUIS, MO.:

CHARLES W. DARBY, D.V.M.,† manager of disease prevention products, Sanitation-Farm Supply Department.

HOBART B. GUERIN, PH.D., livestock research assistant.

ROBERT L. KILGORE, D.V.M., research assistant in animal pathology, Disease Control Laboratories.

ROLAND W. WINTERFIELD, D.V.M., assistant animal pathologist, Disease Control Laboratories.

DEATHS

CHARLES METCALF ALLEN, professor emeritus, noted for his work in hydraulic engineering while on the faculty of Worcester (Mass.) Polytechnic Institute, died August 15 at the age of 78.

MARGARET E. GRAFF,† administrative assistant in the Division of Local Health Services, New York State Department of Health, died recently (Vital Statistics Section).

ISAAC N. KING, M.D., retired health officer of Calvert County, Md., died on June 25 at the age of 76, after an illness of several years duration.

PAUL O. KOMORA, administrative secretary of the New York State Department of Mental Hygiene since 1944, died in July. He was for many years associated with the National Committee for Mental Hygiene.

MARGARET C. LAFFERTY,† Washington, D. C., died recently (Public Health Education Section).

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* Fellow A.P.H.A.
† Member A.P.H.A.

WALTER A. LEONARD, M.D.,* a member of the New York State Council from 1932 to 1949, died July 18 (Health Officers Section).

H. BURTON LOGIE, M.D., St. Mary Bourne, England, former assistant professor of medicine at the University of Alberta, Canada, executive secretary of the National Conference of Nomenclature of Diseases in 1930–1937, and editor of the third edition (1935) of "A Standard Classified Nomenclature of Disease," died June 5 at his home, aged 67.

RICHARD P. MACKNIGHT, M.D., retired official of the Massachusetts Department of Public Health, died August 22. With the Public Health Department for 25 years, he organized the Division of Hospital Inspection.

CHARLES A. NEAL, M.D.,* Ohio State Director of Health from 1929 to 1931, died recently (Health Officers Section).

ALEC N. THOMSON, M.D.,* Administrator of the Eastern Long Island Hospital, New York, since 1947, and former director of medical activities for the Kings County Medical Society, died on July 4 at the age of 68 (Public Health Education Section).

CONFERENCES AND DATES

American Public Health Association. Headquarters, Kiel Auditorium, St. Louis, Mo. October 30–November 3.

Coming in October, November, and December:

American Association for the Advancement of Science. Cleveland, Ohio. Dec. 26–30.

American Association of Blood Banks. Stevens Hotel. Chicago, Ill. Oct. 12–14.

American Economic Association. Chicago, Ill. Dec. 27–30.

American Municipal Association. Washington, D. C. Dec. 3–6.

American Occupational Therapy Association. Glenwood Springs, Colo. Oct. 16–20.

American Political Science Association. Washington, D. C. Dec. 28–30.

American Public Welfare Association. Round Table. Chicago, Ill. Nov. 30–Dec. 2.

American Statistical Association. Congress Hotel, Chicago, Ill. Dec. 27–29.

American Trudeau Society. (Eastern Section). Baltimore, Md. Nov. 10.

American Water Works Association:

- Alabama-Mississippi Section. Mobile, Ala. Oct. 1–3.
- Arizona Section. Tucson. Nov. 30–Dec. 2.
- California Section. San Diego. Oct. 24–27.
- Chesapeake Section. Wilmington, Del. Nov. 1–3.
- Iowa Section. Marshalltown. Oct. 26–27.
- Joint Cuban-Florida Water and Sewage Conference. Fort Lauderdale, Fla. Nov. 13–15.
- Kentucky-Tennessee Section. Memphis. Oct. 23–25.
- Maritime Water Works Assn. St. John, New Brunswick, Canada. Oct. 30–31.
- Michigan Section. Detroit. Oct. 25–27.
- Missouri Section. St. Louis. Oct. 1–3.
- New Jersey Section. Atlantic City. Oct. 26–28.
- North Carolina Section. Durham. Oct. 13–15.
- Pennsylvania Section. Pittsburgh. Oct. 18–20.
- Southeastern Section. Charleston, S. C. Oct. 23–25.
- Southwest Section. New Orleans, La. Oct. 15–18.
- Virginia Section. Richmond. Nov. 6–7.

Association of Military Surgeons. New York, N. Y. Nov. 9–11.

Civil Service Assembly. Annual Conference. Atlanta, Ga. Nov. 27–30.

Family Service Association of America. New York, N. Y. Nov. 16–17.

Federation of Sewage Works. Assns. Washington, D. C. Oct. 9–12.

Florida Public Health Association. Soreno Hotel, St. Petersburg. Oct. 5–7.

International City Managers' Assn. Houston, Tex. Nov. 26–30.

Interstate Postgraduate Medical Association of North America. International Assembly. Hotel Stevens, Chicago, Ill. Nov. 6–9.

Michigan Public Health Association. Grand Rapids, Mich. Pantlind Hotel. Nov. 29–Dec. 1.

National Association of Housing Officials. Hotel Statler. Detroit, Mich. Oct. 16–19.

National Conference on Intergroup Relations. New York, N. Y. Nov. 15–17.

National Committee for Mental Hygiene. New York, N. Y. Nov. 16–17.

National Municipal League. Buffalo, N. Y. Nov. 20–22.

National Recreation Association. Hotel Statler. Cleveland, Ohio. Oct. 2–6.

National Social Welfare Assembly. New York, N. Y. Nov. 28–29.

National Society for Crippled Children and Adults. Stevens Hotel, Chicago, Ill. Oct. 26–28.

New York State Association of Milk and Food Sanitarians. Syracuse, N. Y. Oct. 2–4.

North Dakota Public Health Association. Fargo. Nov. 8–10.

Oklahoma Public Health Association. Oklahoma City, Okla. Nov. 30–Dec. 2.

Pennsylvania Public Health Association. Yorktown Hotel. York, Pa. Oct. 19.

Third Annual Gulf Coast Regional Conference on Industrial Health. Rice Hotel. Houston, Tex. Oct. 12–14.

Third Inter-American Congress on Brucellosis. Washington, D. C. Nov. 6–10.

Thirty-eighth National Safety Congress & Exposition. Stevens Hotel. Chicago, Ill. Oct. 16–20.

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